This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

+ *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.

+ *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.

+ *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.

+ *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at `http://books.google.com/`

EducT
118.55
605

NEWMAN'S FIRST LESSONS.

A

PRIMARY
MENTAL ARITHMETIC;

OR,

THE ARABIC ARITHMETICAL ALPHABET,

AND

THE ELEMENTARY NUMERICAL TABLES;

DESIGNED

TO MAKE BEGINNERS IN ARITHMETIC RAPID AND ACCURATE OPERATORS
IN THE NOTATION, NUMERATION, ADDITION, SUBTRACTION,
MULTIPLICATION AND DIVISION OF SMALL, SIMPLE
NUMBERS, [illegible] NUMBERS AND
COMMON FRACTIONS:

CONTAINING,

GENERALLY, IN THE SAME LESSON, ON THE SAME PAGE, CONCRETE AND ABSTRACT,
NUMBERS, A COMMON TABLE THEREFOR, [illegible] TABLE,
[illegible] SLATE EXERCISES, ETC.

BY W. W. NEWMAN, A. B.

NEW YORK:
D. APPLETON AND COMPANY,
346 AND 348 BROADWAY.
1855.

Educ T 118.55.605

ESSEX INSTITUTE.

Presented by

FILED

1671

LIBRARY CONDITIONS.

The Library to be under the control of the Directors, who may withhold such books from circulation, as they may deem expedient.

Each Member shall be entitled to take from the Library, one folio, or one quarto, or two of any lesser fold, with the plates belonging to the same, upon signing a receipt for the same, and promising to make good any damage which may be sustained when in their possession, or to replace the same, if lost.

No person shall lend any book belonging to the Institute, except to a member, under a penalty of one dollar for every offence.

The Directors may permit other persons than members to use the Library. No member shall detain any book longer than four weeks, after being duly notified that the same is wanted by another member, under a penalty of twenty five cents per week.

On or before the first Wednesday in May all books shall be returned, and a committee of the Directors appointed for that purpose shall examine the Library and make a report of the condition at the Annual Meeting.

HARVARD COLLEGE
LIBRARY

3 2044 096 995 881

NEWMAN'S FIRST LESSONS.

A
PRIMARY
MENTAL ARITHMETIC;

OR

THE ARABIC ARITHMETICAL ALPHABET,

AND

THE ELEMENTARY NUMERICAL TABLES:

DESIGNED

TO MAKE BEGINNERS IN ARITHMETIC RAPID AND ACCURATE OPERATORS
IN THE NOTATION, NUMERATION, ADDITION, SUBTRACTION,
MULTIPLICATION AND DIVISION OF SMALL, SIMPLE
NUMBERS, COMPOUND NUMBERS AND
COMMON FRACTIONS:

CONTAINING,

GENERALLY, IN THE SAME LESSON, ON THE SAME PAGE, CONCRETE AND
ABSTRACT NUMBERS, A COMMON TABLE IMPROVED, AN OUT-
LINE TABLE, A TEST TABLE, SLATE EXERCISES, &c.

BY W. W. NEWMAN, A. B.

NEW YORK:
D. APPLETON AND COMPANY,
346 AND 348 BROADWAY.
1855.

Educ T 118.55.605

[illegible] COLLEGE LIBRARY
GIFT OF
[illegible] ARTHUR PLIMPTON
JANUARY 25, [illegible]

Entered according to Act of Congress, in the year 1854, by
W. W. NEWMAN,
In the Clerk's Office of the District Court for the Northern District of New York.

C. E. FELTON,
STEREOTYPER,
BUFFALO, N. Y.

INTRODUCTORY LETTER.

Fellow-Teachers:—A brother invites your attention to this little work, hoping that you will find it worthy of your approbation.

It is intended for beginners in Arithmetic,—for young children who have only learned to read readily in easy lessons,—and leads by gradually progressive steps, through the notation, numeration, addition, subtraction, multiplication and division of small, simple numbers, compound numbers and common fractions. This is all that it claims; but even these operations, it is believed, cannot be rapidly and intelligently performed by a very large proportion of those who are often considered proficients in Arithmetic. Text-books and teachers too frequently omit the primary tables; and, consequently, scholars hesitate and stumble on the most simple operations in numbers.

In accordance with the most successful school-room practice, a reversed form is added to each of the ordinary tables.

Naught, or the cipher, is inserted in all the tables of the fundamental rules, for experience has shown, that on account of its omission, even advanced pupils sometimes make serious mistakes in its use.

The tables are carried no further than the single figures, because this is a philosophical limit, and in written arithmetic we commonly use only single figures or columns. Indeed, there is no good reason, except the occasional use of "the dozen," why we should have 10, 11 and 12, in these primary tables, that will not also apply to 13, 14 and 15. Where more than one figure is used, the operations can be best learned and understood on the principles of the decimal notation, by using tens, units, &c., as hereafter explained.

The Outline Tables are believed to be appropriate aids for beginners, both in learning and reciting the tables; and they accustom the eye to the association of figures, with their results.

The Slate Exercises are recommended, not by any means, to make this a written arithmetic, but to occupy the leisure time of young pupils in instructive amusement, and to oblige them to notice in detail, many items in the form of figures, and the construction and arrangement of the tables, so as to make more correct and lasting impressions than would be obtained by the use of the book alone.

The Test, and the General Review Tables, are considered very valuable, and the pupil should become emphatically "at home" with them.

Great pains were taken, to have each subject embraced in one lesson, on one page; and this is exhibited in such a variety of systematic processes and forms, that, to the studious and intelligent pupil, it will very soon become a cherished and familiar acquaintance.

There are other peculiarities; such as the Blank Solutions, &c., which, it is hoped, are improvements; but the main feature claimed, is, that pupils are led through the primary operations on small numbers, in so thorough and systematic a manner, that they must necessarily become adepts in this elementary and most important part of arithmetical science.

Believing that those who give this book a thorough trial in the school-room, will come to the same conclusion, it is respectfully submitted to your judgment, by

Your Co-Laborer,
W. W. NEWMAN.

Public School No. 13.
Buffalo, Nov., 1854.

ADVISORY DIRECTIONS.

1. Have each scholar bring to the recitation the Slate Exercises completed, for examination in regard to their numerical accuracy, beauty of arrangement and chirographic execution.

2. Have each member of the class recite the whole table, or require of each, in turn, the recitation of a part, till it is familiar to all.

3. With the outline and the test table on the blackboard, require the class, in concert, or each member of it alone, to recite the outline table from left to right, right to left, top to bottom, and bottom to top; and then with a pointer in the hands of the teacher or a pupil, require the results only, without any explanatory words, of any two numbers in both tables, as they are pointed out promiscuously, till they can be correctly given without hesitation. These tables and the slate exercises may also be recited with the book if preferred.

4. With young and backward scholars, the use of the book in the class, while working the practical examples, has its advantages; but when short questions require several steps in their solution, the pupils should repeat the question after it is read, and give the solution in the precise language of the models furnished by the book or teacher, till they are familiar with them, or can give correct ones of their own.

5. Finally require, especially on a review, that the results only be given in the least possible time, without even reading the question aloud, so that the pupils may become rapid reckoners as well as correct reasoners.

FIRST LESSON.

The Arabic Arithmetical Alphabet.

Printed Figures.	*Written Figures.*	*Their Names.*
0	*0*	Naught.
1	*1*	One.
2	*2*	Two.
3	*3*	Three.
4	*4*	Four.
5	*5*	Five.
6	*6*	Six.
7	*7*	Seven.
8	*8*	Eight.
9	*9*	Nine.

Boys and girls, you have all learned the English Alphabet of twenty-six letters; and you can now read with them in your books. To-day, you are commencing a very important and interesting study, called Arithmetic, in which are used the English letters, and also another new Alphabet; but it is so short and easy, that you can learn to read and write it in one day. In this Alphabet there are only ten letters, which are called figures. There are no Capitals; but each figure has two forms. One is for printing in books; the other for writing on the blackboard, slate and paper.

Note.—Explain to the class, that while the English letters, as m, l and p, differ both in length and width, the printed figures have the same length; and, except 1, about the same width. The written figures have usually the same length, especially when a number of lines of figures are placed together; but when only one line of figures is written, 3 and 6 are sometimes extended above, and 7 and 9 below the common line.

SECOND LESSON.

Forms of the Figures.

My young friends, please find each *printed* figure five times in this book. Make each *written* figure ten times on a slate or blackboard; and make written figures every day till you can make them rapidly and correctly. Carefully study every figure, so that you can describe it.

What is the main difference between the printed and the written figures? *Their position:*—The printed figures stand erect, like common printed letters; but the written figures stand obliquely, like italic letters, or common writing.

Which written figure differs most in form from the same printed figure? *9*, 9.

Of what two figures is written 9 made? 0 and 1.

What is the figure naught like? The letter o.

How is the figure one made?

What figures are made principally of straight marks? 1, 4 and 7.

What figures of curved marks? 2, 3, 6, 8 and printed 9.

What figures have straight *and* curved marks? 5 and written 9.

How many straight marks in 4?

When is 6 like printed 9? When it is inverted.

What change is made in these two rows of figures, by holding the book upside down?

·sǝuıu 6, 6, 6, 6, 6, 6, 6, 6, 6, 6, 6, 6, sixes.
·sǝxıs 9, 9, 9, 9, 9, 9, 9, 9, 9, 9, 9, 9, nines.

NOTE. — The forms, resemblances, differences and peculiarities of the printed and written figures should be made a subject of conversation; and the pupils should be drilled upon the written figures till they can make them rapidly, in a neat and legible manner.

THIRD LESSON.

Arithmetical Spelling.

You have now learned the new alphabet of ten figures, and you may learn with them to spell and read.

Of the twenty-six letters of the English alphabet, only three, A, I, and O, form words; but of the ten arithmetical figures, every one forms an arithmetical word. There are also ninety words of two figures, which you must learn to spell and read.

Write the alphabet on a slate or blackboard, and afterward put a 1 on the left side of each figure. Spell and read these ten new words in this way:

10. One with naught at the right hand is called ten.
11. “ one “ “ “ eleven.
12. “ two “ “ “ twelve.
13. “ three “ “ “ thirteen.
14. “ four “ “ “ fourteen.
15. “ five “ “ “ fifteen.
16. “ six “ “ “ sixteen.
17. “ seven “ “ “ seventeen.
18. “ eight “ “ “ eighteen.
19. “ nine “ “ “ nineteen.

Or you may spell and read in a quicker way; thus:

10. One, naught, ten.
11. “ one, eleven.
12. “ two, twelve.
13. “ three, thirteen.
14. “ four, fourteen.
15. One, five, fifteen.
16. “ six, sixteen.
17. “ seven, seventeen.
18. “ eight, eighteen.
19. “ nine, nineteen.

Note.—The teacher should explain, that where two inverted commas [“] are used, as above, they indicate the words above them, and may be represented on the slate or blackboard by two short lines, with the ordinary script slant or obliquity.

Educ T 118.55.605

ESSEX INSTITUTE.

Presented by

EXCH'D

1/6/71

LIBRARY CONDITIONS.

The Library to be under the control of the Directors, who may withhold such books from circulation, as they may deem expedient.

Each Member shall be entitled to take from the Library, one folio, or one quarto, or two of any lesser fold, with the plates belonging to the same, upon signing a receipt for the same, and promising to make good any damage which may be sustained when in their possession, or to replace the same, if lost.

No person shall lend any book belonging to the Institute, except to a member, under a penalty of one dollar for every offence.

The Directors may permit other persons than members to use the Library. No member shall detain any book longer than four weeks, after being duly notified that the same is wanted by another member, under a penalty of twenty five cents per week.

On or before the first Wednesday in May all books shall be returned, and a committee of the Directors appointed for that purpose shall examine the Library and make a report of the condition at the Annual Meeting.

HARVARD COLLEGE
LIBRARY

3 2044 096 995 881

SIXTH LESSON.

Reading and Writing Numbers.

What boy or girl can spell and read, from your slate, these new short words of two figures? Who can recite them?

You may write on your slate and show your teacher the arithmetical words from 0 to 99 inclusive. Twenty-eight of these, 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 30, 40, 50, 60, 70, 80 and 90, are read with a single English word. The remaining 72 are read with two of these same words, connected by a hyphen. You may, carefully, study these arithmetical words, as they are here arranged, till you can read them very rapidly, in any direction, and without any mistake.

99	8	45	97	6	20	96	1	48	82
53	10	33	86	17	39	80	94	72	4
0	29	26	75	24	46	78	47	34	35
84	38	19	64	37	51	5	13	90	54
71	44	7	52	49	11	63	85	23	12
18	56	69	41	58	60	15	70	2	93
25	68	57	30	61	3	59	67	14	62
36	79	88	27	76	87	40	21	55	73
42	81	77	16	89	74	28	32	66	22
65	98	91	9	95	92	31	50	83	43

Close your books, and write on your slates any of the above numbers that your teacher may read.

Note.—Require sholars to write on their slates any of these numbers, as they are read or spoken, till they can write them without hesitation.

To-morrow, every boy and girl may bring 99 beans or 99 kernels of corn to school, and show your teacher who can count them in the least time.

Note.—The teacher should drill his pupils in counting. Let one count aloud, while the rest listen and correct mistakes. Again, oblige all to count with the lips closed, without even a lisp. Take a few kernels of the 99 from each slate, and require all to count in silence, and write the number on their slates till they agree.

SEVENTH LESSON.

Adding 0 from 0 to 9 inclusive.

1. How many boys are no boys and no boys?
2. How many are 0 and 0?
3. How many boys are no boys and one boy?
4. How many are 0 and 1?
5. How many boys are two boys and no boys?
6. How many are 2 and 0?
7. How many boys are no boys and three boys?
8. How many are 0 and 3?
9. How many boys are four boys and no boys?
10. How many are 4 and 0?
11. How many boys are no boys and five boys?
12. How many are 0 and 5?
13. How many boys are six boys and no boys?
14. How many are 6 and 0?
15. How many boys are no boys and seven boys?
16. How many are 0 and 7?
17. How many boys are eight boys and no boys?
18. How many are 8 and 0?
19. How many boys are no boys and nine boys?
20. How many are 0 and 9?

Learn and recite this table.

	Outline Table.		Test Table.	
0 and 0 are 0; 0 and 0 are 0.	0	0	0	9
0 and 1 are 1; 1 and 0 are 1.	0	1	8	0
0 and 2 are 2; 2 and 0 are 2.	0	2	0	0
0 and 3 are 3; 3 and 0 are 3.	0	3	3	0
0 and 4 are 4; 4 and 0 are 4.	0	4	0	5
0 and 5 are 5; 5 and 0 are 5.	0	5	6	0
0 and 6 are 6; 6 and 0 are 6.	0	6	0	4
0 and 7 are 7; 7 and 0 are 7.	0	7	7	0
0 and 8 are 8; 8 and 0 are 8.	0	8	2	0
0 and 9 are 9; 9 and 0 are 9.	0	9	0	1

Slate Exercises.

0, 1, 2, 3, 4, 5, 6, 7, 8, 9.	0, 0, 0, 0, 0, 0, 0, 0, 0, 0.
0, 0, 0, 0, 0, 0, 0, 0, 0, 0.	1, 8, 2, 9, 3, 7, 4, 6, 0, 5.
0, 1, 2, 3, 4, 5, 6, 7, 8, 9.	1, 8, 2, 9, 3, 7, 4, 6, 0, 5.

EIGHTH LESSON.

Adding 1 *from* 0 *to* 9 *inclusive.*

1. How many girls are no girls and one girl?
2. How many are 0 and 1?
3. How many girls are one girl and one girl?
4. How many are 1 and 1?
5. How many girls are two girls and one girl?
6. How many are 2 and 1?
7. How many girls are one girl and three girls?
8. How many are 1 and 3?
9. How many girls are four girls and one girl?
10. How many are 4 and 1?
11. How many girls are one girl and five girls?
12. How many are 1 and 5?
13. How many girls are six girls and one girl?
14. How many are 6 and 1?
15. How many girls are one girl and seven girls?
16. How many are 1 and 7?
17. How many girls are eight girls and one girl?
18. How many are 8 and 1?
19. How many girls are one girl and nine girls?
20. How many are 1 and 9?

Learn and recite this table.

		Outline Table.		Test Table	
1 and 0 are 1;	0 and 1 are 1.	1	0	1	9
1 and 1 are 2;	1 and 1 are 2.	1	1	0	1
1 and 2 are 3;	2 and 1 are 3.	1	2	1	2
1 and 3 are 4;	3 and 1 are 4.	1	3	8	1
1 and 4 are 5;	4 and 1 are 5.	1	4	1	3
1 and 5 are 6;	5 and 1 are 6.	1	5	6	1
1 and 6 are 7;	6 and 1 are 7.	1	6	1	4
1 and 7 are 8;	7 and 1 are 8.	1	7	7	1
1 and 8 are 9;	8 and 1 are 9.	1	8	1	5
1 and 9 are 10;	9 and 1 are 10.	1	9	1	1

Slate Exercises.		
	0, 1, 2, 3, 4, 5, 6, 7, 8, 9.	1, 1, 1, 1, 1, 1, 1, 1, 1, 1.
	1, 1, 1, 1, 1, 1, 1, 1, 1, 1.	0, 1, 2, 3, 4, 5, 6, 7, 8, 9.
	1, 2, 3, 4, 5, 6, 7, 8, 9, 10.	1, 2, 3, 4, 5, 6, 7, 8, 9, 10.

NINTH LESSON.

Adding 2 *from* 0 *to* 9 *inclusive.*

1. How many apes are no apes and two apes?
2. How many are 0 and 2?
3. How many arms are two arms and one arm?
4. How many are 2 and 1?
5. How many aunts are two aunts and two aunts?
6. How many are 2 and 2?
7. How many axes are two axes and three axes?
8. How many are 2 and 3?
9. How many bags are four bags and two bags?
10. How many are 4 and 2?
11. How many barrels are two barrels and five barrels?
12. How many are 2 and 5?
13. How many bats are six bats and two bats?
14. How many are 6 and 2?
15. How many beads are two beads and seven beads?
16. How many are 2 and 7?
17. How many beaux are eight beaux and two beaux?
18. How many are 8 and 2?
19. How many bears are two bears and nine bears?
20. How many are 2 and 9?

Learn and recite this table.

		Outline Table.		Test Table.	
2 and 0 are 2;	0 and 2 are 2.	2	0	2	8
2 and 1 are 3;	1 and 2 are 3.	2	1	1	2
2 and 2 are 4;	2 and 2 are 4.	2	2	2	9
2 and 3 are 5;	3 and 2 are 5.	2	3	0	2
2 and 4 are 6;	4 and 2 are 6.	2	4	2	5
2 and 5 are 7;	5 and 2 are 7.	2	5	3	2
2 and 6 are 8;	6 and 2 are 8.	2	6	2	6
2 and 7 are 9;	7 and 2 are 9.	2	7	4	2
2 and 8 are 10;	8 and 2 are 10.	2	8	2	2
2 and 9 are 11;	9 and 2 are 11.	2	9	7	2

S. E. to be finished.

9, 1, 7, 3, 5, 0, 8, 2, 6, 4.   2, 2, 2, 2, 2, 2, 2, 2, 2, 2.
2, 2, 2, 2, 2, 2, 2, 2, 2, 2.   2, 0, 8, 4, 7, 3, 6, 9, 1. 5.

TENTH LESSON.

Adding 3 from 0 to 9 inclusive.

1. How many beds are three beds and no beds?
2. How many are 3 and 0?
3. How many bees are one bee and three bees?
4. How many are 1 and 3?
5. How many bells are three bells and two bells?
6. How many are 3 and 2?
7. How many beans are three beans and three beans?
8. How many are 3 and 3?
9. How many bears are three bears and four bears?
10. How many are 3 and 4?
11. How many bibs are three bibs and five bibs?
12. How many are 3 and 5?
13. How many birds are six birds and three birds?
14. How many are 6 and 3?
15. How many blocks are three blocks and seven blocks?
16. How many are 3 and 7?
17. How many blots are eight blots and three blots?
18. How many are 8 and 3?
19. How many boards are three boards and nine boards?
20. How many are 3 and 9?

Learn and recite this table.

	Outline Table.		Test Table.	
3 and 0 are 3; 0 and 3 are 3.	3	0	3	3
3 and 1 are 4; 1 and 3 are 4.	3	1	5	3
3 and 2 are 5; 2 and 3 are 5.	3	2	3	1
3 and 3 are 6; 3 and 3 are 6.	3	3	7	3
3 and 4 are 7; 4 and 3 are 7.	3	4	3	9
3 and 5 are 8; 5 and 3 are 8.	3	5	2	3
3 and 6 are 9; 6 and 3 are 9.	3	6	3	4
3 and 7 are 10; 7 and 3 are 10.	3	7	6	3
3 and 8 are 11; 8 and 3 are 11.	3	8	3	8
3 and 9 are 12; 9 and 3 are 12.	3	9	0	3

S. E. to be finished.

3, 6, 0, 9, 2, 8, 1, 7, 4, 5. 3, 3, 3, 3, 3, 3, 3, 3, 3, 3.
3, 3, 3, 3, 3, 3, 3, 3, 3, 3. 9, 2, 7, 4, 5, 0, 6, 3, 8, 1.

ELEVENTH LESSON.

Adding 4 *from* 0 *to* 9 *inclusive.*

1. How many boats are four boats and no boats?
2. How many are 4 and 0?
3. How many tents are one tent and four tents?
4. How many are 1 and 4?
5. How many books are four books and two books?
6. How many are 4 and 2?
7. How many boxes are three boxes and four boxes?
8. How many are 3 and 4?
9. How many bunns are four bunns and four bunns?
10. How many are 4 and 4?
11. How many thanks are four thanks and five thanks?
12. How many are 4 and 5?
13. How many cabs are six cabs and four cabs?
14. How many are 6 and 4?
15. How many calves are four calves and seven calves?
16. How many are 4 and 7?
17. How many tops are eight tops and four tops?
18. How many are 8 and 4?
19. How many canes are four canes and nine canes?
20. How many are 4 and 9?

Learn and recite this table.

		Outline Table.		Test Table.	
4 and 0 are 4;	0 and 4 are 4.	4	0	4	4
4 and 1 are 5;	1 and 4 are 5.	4	1	9	4
4 and 2 are 6;	2 and 4 are 6.	4	2	4	0
4 and 3 are 7;	3 and 4 are 7.	4	3	8	4
4 and 4 are 8;	4 and 4 are 8.	4	4	4	1
4 and 5 are 9;	5 and 4 are 9.	4	5	7	4
4 and 6 are 10;	6 and 4 are 10.	4	6	4	2
4 and 7 are 11;	7 and 4 are 11.	4	7	6	4
4 and 8 are 12;	8 and 4 are 12.	4	8	4	5
4 and 9 are 13;	9 and 4 are 13.	4	9	3	4

S. E. to be finished.

0, 8, 2, 6, 4, 1, 9, 3, 7, 5. 4, 4, 4, 4, 4, 4, 4, 4, 4, 4.
4, 4, 4, 4, 4, 4, 4, 4, 4, 4. 4, 0, 6, 2, 8, 1, 9, 7, 3, 5.

TWELFTH LESSON.

Adding 5 *from* 0 *to* 9 *inclusive.*

1. Five caps and no caps are how many caps?
2. Five and 0 are how many?
3. One car and five cars are how many cars?
4. One and 5 are how many?
5. Five years and two years are how many years?
6. Five and 2 are how many?
7. Three cats and five cats are how many cats?
8. Three and 5 are how many?
9. Five cents and four cents are how many cents?
10. Five and 4 are how many?
11. Five chains and five chains are how many chains?
12. Five and 5 are how many?
13. Six chairs and five chairs are how many chairs?
14. Six and 5 are how many?
15. Five chaises and seven chaises are how many chaises?
16. Five and 7 are how many?
17. Eight cherries and five cherries are how many cherries?
18. Eight and 5 are how many?
19. Five chickens and nine chickens are how many chickens?
20. Five and 9 are how many?

Learn and recite this table.

		Outline Table.		Test Table,	
5 and 0 are 5;	0 and 5 are 5.	5	0	9	5
5 and 1 are 6;	1 and 5 are 6.	5	1	5	0
5 and 2 are 7;	2 and 5 are 7.	5	2	4	5
5 and 3 are 8;	3 and 5 are 8.	5	3	5	8
5 and 4 are 9;	4 and 5 are 9.	5	4	2	5
5 and 5 are 10;	5 and 5 are 10.	5	5	5	6
5 and 6 are 11;	6 and 5 are 11.	5	6	3	5
5 and 7 are 12;	7 and 5 are 12.	5	7	5	1
5 and 8 are 13;	8 and 5 are 13.	5	8	7	5
5 and 9 are 14;	9 and 5 are 14.	5	9	5	5

S. E. to be finished.

0, 5, 8, 1, 6, 3, 4, 7, 2, 9.   5, 5, 5, 5, 5, 5, 5, 5, 5, 5.
5, 5, 5, 5, 5, 5, 5, 5, 5, 5.   9, 7, 5, 3, 1, 8, 6, 4, 2, 0.

THIRTEENTH LESSON.

Adding 6 *from* 0 *to* 9 *inclusive.*

1. No whips and six whips are how many whips?
2. Nought and 6 are how many?
3. Six churches and one church are how many churches?
4. Six and 1 are how many?
5. Two classes and six classes are how many classes?
6. Two and 6 are how many?
7. Six clerks and three clerks are how many clerks?
8. Six and 3 are how many?
9. Four coaches and six coaches are how many coaches?
10. Four and 6 are how many?
11. Six coats and five coats are how many coats?
12. Six and 5 are how many?
13. Six colts and six colts are how many colts?
14. Six and 6 are how many?
15. Seven combs and six combs are how many combs?
16. Seven and 6 are how many?
17. Six cousins and eight cousins are how many cousins?
18. Six and 8 are how many?
19. Nine cows and six cows are how many cows?
20. Nine and 6 are how many?

Learn and recite this table.

		Outline Table.		Test Table.	
6 and 0 are 6;	0 and 6 are 6.	6	0	6	5
6 and 1 are 7;	1 and 6 are 7.	6	1	9	6
6 and 2 are 8;	2 and 6 are 8.	6	2	6	0
6 and 3 are 9;	3 and 6 are 9.	6	3	8	6
6 and 4 are 10;	4 and 6 are 10.	6	4	6	1
6 and 5 are 11:	5 and 6 are 11.	6	5	7	6
6 and 6 are 12;	6 and 6 are 12.	6	6	6	4
6 and 7 are 13;	7 and 6 are 13.	6	7	2	6
6 and 8 are 14;	8 and 6 are 14.	6	8	6	6
6 and 9 are 15;	9 and 6 are 15.	6	9	8	6

S. E. to be finished.

9, 0, 8, 1, 7, 3, 5, 2, 4, 6.   6, 6, 6, 6, 6, 6, 6, 6, 6, 6.
6, 6, 6, 6, 6, 6, 6, 6, 6, 6.   7, 1, 9, 3, 8, 0, 2, 5, 6, 4.

FOURTEENTH LESSON.

Adding 7 from 0 to 9 inclusive.

1. William has 7 cents in one pocket, and none in the other; how many cents in both pockets?

2. Mary found 1 egg in one nest, and 7 in another; how many did she find in all?

3. George found 2 apples under one tree, and 7 under another; how many did he find under both trees?

4. On one bench are 3 scholars, and on another are 7; how many are on the two benches?

5. If you pay 7 cents for a slate, and 4 cents for a lead pencil, how many cents do you pay for both?

6. There were 5 roses on one bush, and 7 on another; how many were there on both bushes?

7. John brought his mother 6 apples, and Henry brought her 7 more; how many did both bring?

8. If there are 7 boys in one class, and 7 in another, how many are there in the two classes?

9. James has eight books, and Jane has 9; how many have they in all?

10. If I learn 9 questions in the forenoon, and 9 in the afternoon how many do I learn during the day?

Learn and recite this table.

	Outline Table.		Test Table.	
7 and 0 are 7; 0 and 7 are 7.	7	0	7	7
7 and 1 are 8; 1 and 7 are 8.	7	1	0	7
7 and 2 are 9; 2 and 7 are 9.	7	2	7	9
7 and 3 are 10; 3 and 7 are 10.	7	3	1	7
7 and 4 are 11; 4 and 7 are 11.	7	4	7	8
7 and 5 are 12; 5 and 7 are 12.	7	5	2	7
7 and 6 are 13; 6 and 7 are 13.	7	6	7	5
7 and 7 are 14; 7 and 7 are 14.	7	7	3	7
7 and 8 are 15; 8 and 7 are 15.	7	8	7	4
7 and 9 are 16; 9 and 7 are 16.	7	9	6	7

S. E. to be finished.

8, 2, 4, 6, 0, 1, 3, 5, 7, 9.   7, 7, 7, 7, 7, 7, 7, 7, 7, 7.
7, 7, 7, 7, 7, 7, 7, 7, 7, 7.   9, 7, 5, 3, 1, 8, 2, 4, 6, 0.

FIFTEENTH LESSON.

Adding 8 *from* 0 *to* 9 *inclusive.*

1. If Sarah has 8 books and Eliza none, how many books have both?

2. If there are 8 pears on one tree, and 1 on another, how many are there on the two trees?

3. James has 2 oranges, and Jacob has 8; how many have the two boys?

4. A man gave his wife 8 dollars, and his daughter 3, how many dollars did he give away?

5. If there are 4 horses in one field, and 8 in another, how many horses in both fields?

6. Samuel found 8 eggs in one nest, and 5 in another; how many eggs in the two nests?

7. If there are 6 panes in one window, and 8 in another, how many panes in both windows?

8. If Joseph answered 8 questions in this book, and Charles 7, how many did the two boys answer?

9. If you give 8 cents for a slate, and 8 cents for a book, how much do you give for both?

10. If the age of one boy is 9 years, and of another 8 years, what is the sum of their ages?

Learn and recite this table.

		Outline Table.		Test Table.	
8 and 0 are 8;	0 and 8 are 8.	8	0	8	9
8 and 1 are 9;	1 and 8 are 9.	8	1	0	8
8 and 2 are 10;	2 and 8 are 10.	8	2	8	8
8 and 3 are 11;	3 and 8 are 11.	8	3	1	8
8 and 4 are 12;	4 and 8 are 12.	8	4	8	7
8 and 5 are 13;	5 and 8 are 13.	8	5	2	8
8 and 6 are 14;	6 and 8 are 14.	8	6	8	6
8 and 7 are 15;	7 and 8 are 15.	8	7	3	8
8 and 8 are 16;	8 and 8 are 16.	8	8	8	5
8 and 9 are 17;	9 and 8 are 17.	8	9	4	8

S. E. to be finished.

0, 7, 1, 5, 3, 8, 4, 2, 6, 9.	8, 8, 8, 8, 8, 8, 8, 8, 8, 8.
8, 8, 8, 8, 8, 8, 8, 8, 8, 8.	6, 3, 1, 9, 7, 8, 5, 2, 4, 0

SIXTEENTH LESSON.

Adding 9 from 0 to 9 inclusive.

1. Nancy gave 9 cents for a slate, and nothing for a pencil; how much did the slate and pencil cost?

2. David gave his sister 1 plum, and his mother 9; how many did he give to both?

3. There are 9 trees in one garden, and 2 in another; how many are there in the two gardens?

4. Three boys of a class are idle, and 9 are studying; how many boys are in the class?

5. Nathan has 9 sheets of paper, and Joshua 4; how many have the two boys?

6. If you have 5 walnuts in one pocket, and 9 in the other, how many have you in all?

7. If you earn 9 cents at one time, and 6 at another, how many do you earn at both times?

8. Seven girls are at one party, and 9 at another; how many girls at both parties?

9. If one hen has 9 chickens, and another 8, how many chickens have the two hens?

10. If a girl gives her father 9 kisses, and her mother 9, how many does she give to both?

Learn and recite this table.

	Outline Table.		Test Table.	
9 and 0 are 9; 0 and 9 are 9.	9	0	9	6
9 and 1 are 10; 1 and 9 are 10.	9	1	4	9
9 and 2 are 11; 2 and 9 are 11.	9	2	9	1
9 and 3 are 12; 3 and 9 are 12.	9	3	3	9
9 and 4 are 13; 4 and 9 are 13.	9	4	9	9
9 and 5 are 14; 5 and 9 are 14.	9	5	7	9
9 and 6 are 15; 6 and 9 are 15.	9	6	9	2
9 and 7 are 16; 7 and 9 are 16.	9	7	5	9
9 and 8 are 17; 3 and 9 are 17.	9	8	9	8
9 and 9 are 18; 9 and 9 are 18.	9	9	0	9

S. E. to be finished.

5, 0, 6, 1, 7, 2, 8, 3, 9, 4.
9, 9, 9, 9, 9, 9, 9, 9, 9, 9.

9, 9, 9, 9, 9, 9, 9, 9, 9, 9.
9, 3, 1, 7, 0, 2, 4, 6, 8, 5.

SEVENTEENTH LESSON.

General Review or Test Table in adding Single Figures.

9 9	4 0	1 9	8 3	6 8	2 7	4 4	7 8	3 1	0 5
0 7	5 5	8 7	9 5	0 4	3 2	1 7	9 3	4 7	9 1
4 6	9 7	4 8	1 1	9 6	5 4	9 0	0 6	9 4	7 0
7 3	1 8	0 0	6 4	5 7	0 8	3 6	2 9	1 0	8 6
1 2	0 3	9 2	0 9	4 5	6 1	5 2	4 1	6 3	4 3
2 8	8 1	5 3	7 6	2 2	4 9	2 3	6 0	7 2	5 0
3 0	6 9	6 6	3 7	1 3	9 8	6 5	8 4	2 5	1 4
5 9	7 7	2 1	4 2	3 9	8 5	0 1	1 5	0 2	6 2
6 7	2 6	3 5	2 0	7 1	1 6	7 9	3 8	5 1	2 4
8 8	3 4	7 4	5 8	8 0	7 5	8 2	5 6	8 9	3 3

NOTE.—This table may be read in columns or lines, by naming aloud only the sum of any two figures given. The pupil who can do this correctly in the least time, is most thoroughly master of the addition of single figures.

All the Addition Tables in One View, with the New Combinations in larger type.

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	Tables.	New c's	Old c'ns
0 0	1 0	2 0	3 0	4 0	5 0	6 0	7 0	8 0	9 0	1st.	10	0
0 1	1 1	2 1	3 1	4 1	5 1	6 1	7 1	8 1	9 1	2d.	9	1
0 2	1 2	2 2	3 2	4 2	5 2	6 2	7 2	8 2	9 2	3d.	8	2
0 3	1 3	2 3	3 3	4 3	5 3	6 3	7 3	8 3	9 3	4th.	7	3
0 4	1 4	2 4	3 4	4 4	5 4	6 4	7 4	8 4	9 4	5th.	6	4
0 5	1 5	2 5	3 5	4 5	5 5	6 5	7 5	8 5	9 5	6th.	5	5
0 6	1 6	2 6	3 6	4 6	5 6	6 6	7 6	8 6	9 6	7th.	4	6
0 7	1 7	2 7	3 7	4 7	5 7	6 7	7 7	8 7	9 7	8th.	3	7
0 8	1 8	2 8	3 8	4 8	5 8	6 8	7 8	8 8	9 8	9th.	2	8
0 9	1 9	2 9	3 9	4 9	5 9	6 9	7 9	8 9	9 9	10th.	1	9

NOTE.—This table should be examined and understood by the pupils. It shows that as the tables become more difficult, the number of new combinations becomes less, till in the last table there is but one combination not yet learned. It also shows that there are but 55 possible combinations in the addition of the ten figures. When these are so thoroughly learned that the result comes instantly into the mind, a good foundation is laid for an arithmetician and accountant. If we consider the two ways of reading the same combination, as 8 and 9, 9 and 8, two combinations, and call each of the ten that are the same both ways, as 8 and 8, one combination, we have just 100 possible questions in the addition of the ten Arabic figures.

EIGHTEENTH LESSON.

Table of Combinations.

Tell how many and which combinations in the ten addition tables, make the different numbers from 0 to 18 inclusive.

One Combination makes 0.

0 and 0 are 0.

Two c'ns make 1.

0 and 1 are 1.
1 and 0 are 1.

Three c'ns make 2.

0 and 2 are 2.
2 and 0 are 2.
1 and 1 are 2.

Four c'ns make 3.

0 and 3 are 3.
3 and 0 are 3.
1 and 2 are 3.
2 and 1 are 3.

Five c'ns make 4.

0 and 4 are 4.
4 and 0 are 4.
1 and 3 are 4.
3 and 1 are 4.
2 and 2 are 4.

Six c'ns make 5.

0 and 5 are 5.
5 and 0 are 5.
1 and 4 are 5.
4 and 1 are 5.
2 and 3 are 5.
3 and 2 are 5.

Seven c'ns make 6.

0 and 6 are 6.
6 and 0 are 6.
1 and 5 are 6.
5 and 1 are 6.
2 and 4 are 6.
4 and 2 are 6.
3 and 3 are 6.

Eight c'ns make 7.

0 and 7 are 7.
7 and 0 are 7.
1 and 6 are 7.
6 and 1 are 7.
2 and 5 are 7.
5 and 2 are 7.
3 and 4 are 7.
4 and 3 are 7.

Nine c'ns make 8.

0 and 8 are 8.
8 and 0 are 8.
1 and 7 are 8.
7 and 1 are 8.
2 and 6 are 8.
6 and 2 are 8.
3 and 5 are 8.
5 and 3 are 8.
4 and 4 are 8.

Ten c'ns make 9.

0 and 9 are 9.
9 and 0 are 9.
1 and 8 are 9.
8 and 1 are 9.
2 and 7 are 9.
7 and 2 are 9.
3 and 6 are 9.
6 and 3 are 9.
4 and 5 are 9.
5 and 4 are 9.

Nine c'ns make 10.

1 and 9 are 10.
9 and 1 are 10.
2 and 8 are 10.
8 and 2 are 10.
3 and 7 are 10.
7 and 3 are 10.
4 and 6 are 10.
6 and 4 are 10.
5 and 5 are 10.

Eight c'ns make 11.

2 and 9 are 11.
9 and 2 are 11.
3 and 8 are 11.
8 and 3 are 11.
4 and 7 are 11.
7 and 4 are 11.
5 and 6 are 11.
6 and 5 are 11.

Seven c'ns make 12.

3 and 9 are 12.

9 and 3 are 12.
4 and 8 are 12.
8 and 4 are 12.
5 and 7 are 12.
7 and 5 are 12.
6 and 6 are 12.
Six c'ns make 13.
4 and 9 are 13.
9 and 4 are 13.
5 and 8 are 13.
8 and 5 are 13.

6 and 7 are 13.
7 and 6 are 13.
Five c'ns make 14.
5 and 9 are 14.
9 and 5 are 14.
6 and 8 are 14.
8 and 6 are 14.
7 and 7 are 14.
Four c'ns make 15.
6 and 9 are 15.
9 and 6 are 15.

7 and 8 are 15.
8 and 7 are 15.
Three c'ns make 16.
7 and 9 are 16.
9 and 7 are 16.
8 and 8 are 16.
Two c'ns make 17.
8 and 9 are 17.
9 and 8 are 17.
One c'n makes 18.
9 and 9 are 18.

Note.—This table shows that the number of combinations increases regularly from 1 to 10, and decreases regularly from 10 to 1.

NINETEENTH LESSON.

Tables of 3, 4 *or* 5 *Figures, to be added only from left to right.*

9, 0, 9.
0, 9, 9.
9, 0, 8.
0, 9, 8.
9, 0, 7.
0, 9, 7.
9, 0, 6.
0, 9, 6.
9, 0, 5.
0, 9, 5.
9, 0, 4.
0, 9, 4.
9, 0, 3.

1, 8, 3.
8, 0, 1.
1, 8, 7.
8, 0, 4.
0, 8, 3.
8, 1, 7.
8, 0, 3.
3, 6, 9.
6, 1, 4.
2, 6, 3.
6, 2, 1.
7, 1, 7.
2, 6, 8.

5, 4, 7.
4, 3, 8.
3, 6, 8.
7, 1, 9.
2, 6, 4.
7, 0, 3.
2, 7, 4.
1, 7, 7.
1, 6, 5.
0, 7, 4.
8, 1, 4.
6, 1, 8.
3, 6, 5.

2, 1, 3, 9.
3, 4, 2, 9.
5, 2, 1, 8.
4, 3, 2, 7.
2, 0, 7, 4.
8, 0, 1, 9.
3, 2, 4, 6.
7, 2, 0, 9.
3, 5, 1, 2.
6, 2, 1, 7.
2, 1, 6, 9.
7, 0, 2, 1.
0, 8, 1, 3.

0, 1, 2, 3, 9.
1, 0, 2, 3, 8.
1, 3, 3, 0, 7.
3, 2, 1, 0, 6.
4, 2, 1, 2, 5.
1, 3, 3, 2, 7.
3, 0, 1, 2, 9.
2, 0, 1, 3, 9.
5, 3, 1, 0, 9.
3, 5, 0, 1, 6.
6, 2, 0, 1, 9.
2, 0, 1, 6, 8.
4, 3, 0, 1, 6.

Note.—These tables are so constructed that the sum, omitting the right-hand figure, is always only one figure; and therefore they only present a new application of tables already learned. Scholars can soon learn to construct these tables for themselves on their slates, there being several hundred combinations. These tables may be recited with the book in several ways, depending on the object in view.

Example. 2, 1, 3, 0, 9. 2 and 1 are 3. 3 and 3 are 6. 6 and 0 are 6. 6 and 9 are 15. Or by only naming the sums, as 3, 6, 6, 15. As the 0 does not increase the sum it can be omitted when rapid operations are required. The example will then be recited thus; 3, 6, 15.

TWENTIETH LESSON.

Adding Units and Tens.

1. How can you write the sum of any one figure and 10? *Answer.* Put the figure in the place of 0 at the right of 1.

2. How can you write the sum of any one figure and 20? *Ans.* Put the figure in the place of 0 at the right of 2.

3. How can you write the sum of any one figure and 30? *Ans.* Put the figure in the place of 0 at the right of 3.

4. How can you write the sum of any one figure and 40? *Ans.* Put the figure in the place of 0 at the right of 4.

5. How can you write the sum of any one figure and 50, 60, 70, 80 or 90? *Ans.* Put the figure in the place of 0 at the right of 5, 6, 7, 8 or 9.

6. How can you find the sum of any single figure and any number of tens? *Ans.* By putting the single figure in the place of 0, the figures will express the sum.

Work these examples on your slates as they are here done, by marking the 0, and writing the figure to be added, at the right.

1 and 10 or 10 and 1 are $[1\cancel{0}\ 1]$ 11.
5 and 10 or 10 and 5 are $[1\cancel{0}\ 5]$ 15.
6 and 20 or 20 and 6 are $[2\cancel{0}\ 6]$ 26.
9 and 80 or 80 and 9 are $[8\cancel{0}\ 9]$ 89.
8 and 60 or 60 and 8 are $[6\cancel{0}\ 8]$ 68.
7 and 90 or 90 and 7 are $[9\cancel{0}\ 7]$ 97.
4 and 40 or 40 and 4 are $[4\cancel{0}\ 4]$ 44.

Work the same examples on your slates, by rubbing out the 0, and writing in its place the figure to be added.

7. How many are 90 and 9? 9 and 80? 20 and 4?
8. How many are 7 and 30? 60 and 6? 5 and 30?
9. How many are 20 and 5? 4 and 50? 50 and 8?

NOTE.—Require the class to work examples both ways on their slates; also mentally, till the sums of all examples of this kind can be given instantly.

TWENTY-FIRST LESSON.

Analysis of Numbers from 0 *to* 99.

tens.	units.	tens.	units.	tens.	units.	tens.	units.	tens.	units.	tens.	units.	tens.	units.	units.	units.
7	5.	3	6	4	8.	5	9.	9	7.	6	6.	2	0.	9.	4.

What is the right-hand figure of 75 called? Five.

What are both figures called? Seventy-five.

Then what must the left-hand figure 7, be? Seventy.

What are the right-hand figures of 10, 21, 32, 43, 54, 65, 76, 87, 98, 89? *Ans.* 0, 1, 2, 3, 4, 5, 6, 7, 8, 9.

What are both figures of each number called?

Then what must the left-hand figures be?

Ans. 10, 20, 30, 40, 50, 60, 70, 80, 90, 80.

Any number written with two figures may be considered two numbers, and may be correctly read in two ways besides the ordinary mode already taught. Thus 45 may be read forty-five, or forty and five, or five and forty.

Read in these three ways 12, 21, 36, 47, 59, 74, 83, 98.

What is the last syllable used in speaking each of the numbers,—13, 14, 15, 16, 17, 18, 19?

What is the last syllable used in speaking each of the numbers,— 20, 30, 40, 50, 60, 70, 80, 90?

What do the syllables *teen* and *ty* signify? Ten.

Then why are not six-*teen* and six-*ty* the same?

Ans. Because custom or fashion has decided to use one for six *and* ten; the other for six tens, or six *times* ten.

All figures standing alone, or at the right hand, represent units or ones: all figures next left of units represent tens. 0 is no units; 1 is one unit. 2, 3, 4, 5, 6, 7, 8, 9 are 2, 3, 4, 5, 6, 7, 8, 9 units. 10 is 1 ten. 20, 30, 40, 50, 60, 70, 80, 90 are 2, 3, 4, 5, 6, 7, 8, 9 tens. 13 is 1 ten and 3 units. 30 is 3 tens, or 3 tens and no units. Analyze 14, 40; 15, 50; 16, 60; 17, 70; 18, 80; 19, 90 Analyze 86, 57, 24, 12, 53, 65. Turn to the sixth l son, and analyze the numbers there printed till you c analyze any of them correctly.

TWENTY-SECOND LESSON.

Adding two figures to one figure, or one to two.*

1. 18 and 9 or 9 and 18 are how many?

SOLUTION. 18 *is* 1 *ten and* 8 *units.* 8 *units and* 9 *units are* 17 *units, which are* 1 *ten and* 7 *units.* 1 *ten and* 1 *ten are* 2 *tens.* 2 *tens and* 7 *units are* 27. *Therefore,* 18 *and* 9 *are* 27.

2. 27 and 9 or 9 and 27 are how many?

BLANK SOLUTION. — *is* — *tens and* — *units.* — *units and* — *units are* — *units, which are one ten and* — *units.* — *tens and one ten are* — *tens.* — *tens and* — *units are* ——. *Therefore* — *and* — *are* ——.

Solve the following questions according to this model, with the book open, filling up the blanks correctly, till you can solve any of them in the same words with the book closed.

3. 36 and 9 or 9 and 36 are how many?
4. 45 and 9 or 9 and 45 are how many?
5. 54 and 9 or 9 and 54 are how many?
6. 63 and 9 or 9 and 63 are how many?
7. 72 and 9 or 9 and 72 are how many?
8. 16 and 8 or 8 and 16 are how many?
9. 24 and 8 or 8 and 24 are how many?
10. 32 and 8 or 8 and 32 are how many?
11. 40 and 8 or 8 and 40 are how many?
12. 48 and 8 or 8 and 48 are how many?
13. 56 and 8 or 8 and 56 are how many?
14. 64 and 8 or 8 and 64 are how many?
15. 14 and 7 or 7 and 14 are how many?
16. 21 and 7 or 7 and 21 are how many?
17. 28 and 7 or 7 and 28 are how many?
18. 35 and 7 or 7 and 35 are how many?
19. 42 and 7 or 7 and 42 are how many?
20. 49 and 7 or 7 and 49 are how many?

---

* We trust that the technical use of *figure* in this sense, here and elsewhere, will not be censured, as it briefly and simply conveys to the child the idea intended.

TWENTY-THIRD LESSON.

Adding two figures to two figures.

1. 45 and 38 or 38 and 45 are how many?

SOLUTION. 45 is 4 *tens and* 5 *units.* 38 *is* 3 *tens and* 8 *units.* 5 *units and* 8 *units are* 13 *units, which are* 1 *ten and* 3 *units.* 4 *tens and* 3 *tens are* 7 *tens..* 7 *tens and* 1 *ten are* 8 *tens.* 8 *tens and* 3 *units are* 83. *Therefore* 45 *and* 38 *are* 83.

2. 54 and 28 or 28 and 54 are how many?

BLANK SOLUTION. — *is* — *tens and* — *units.* — *is* — *tens and* — *units.* — *units and* — *units are* — *units, which are one ten and* — *units.* — *tens and* — *tens are* — *tens.* — *tens and one ten are* — *tens.* — *tens and* — *units are* ——. *Therefore* — *and* — *are* ——.

3. 63 and 19 or 19 and 63 are how many?
4. 67 and 28 or 28 and 67 are how many?
5. 45 and 39 or 39 and 45 are how many?
6. 57 and 26 or 26 and 57 are how many?
7. 18 and 19 or 19 and 18 are how many?
8. 23 and 29 or 29 and 23 are how many?
9. 39 and 46 or 46 and 39 are how many?
10. 17 and 65 or 65 and 17 are how many?

You may answer the following questions as quickly as possible, by merely naming the results.

11. How many are 10 and 10? 30 and 10? 60 and 10?
12. How many are 11 and 11? 22 and 11? 33 and 11?
13. How many are 20 and 30? 50 and 40? 30 and 60?
14. How many are 22 and 33? 33 and 44? 55 and 33?
15. How many are 16 and 61? 17 and 71? 18 and 81?
16. How many are 12 and 42? 32 and 22? 52 and 32?
17. How many are 25 and 15? 45 and 15? 75 and 15?
18. How many are 24 and 16? 44 and 16? 64 and 16?
19. How many are 47 and 13? 27 and 23? 37 and 33?
20. How many are 12 and 26? 22 and 46? 32 and 56?
21. How many are 19 and 32? 29 and 62? 39 and 42?
22. How many are 38 and 29? 37 and 48? 45 and 54

TWENTY-FOURTH LESSON.

Practical Questions in Addition.

1. A man paid his butcher 9 dollars, his grocer 8 dollars, his baker 7 dollars, and had 6 dollars left; how much had he at first?

2. A farmer has 4 horses, 3 colts, 8 cows, 2 oxen, 6 young cattle, 7 hogs and 26 sheep; how many in all?

3. In a dairy, the Monday's cheese weighed 14 pounds, Tuesday's 15, Wednesday's 16, Thursday's 17, Friday's 18, Saturday's 19, and Sunday's milk was saved for butter; how many pounds of cheese were made during the week?

4. A farmer gathered 15 bushels of apples from one tree, 20 from another, 25 from another, and 30 from another; how many bushels did he gather from the 4 trees?

5. If there are 5 counties in Rhode Island, 8 in Connecticut, 10 in New Hampshire, 13 in Maine, 14 in Vermont, and 14 in Massachusetts; how many counties are in the six New England states?

6. If there are 12 scholars in the A class of our school, 13 in the B, 14 in the C, 15 in the D, 16 in the E, and 17 in the F class, how many scholars are in the 6 classes?

7. If my age is 9 years, and father is 28 years older than I am, and grandfather is 35 years older than father; how old are they?

8. If mother is 23 years older than I am, and grandmother 30 years older than mother; how old are they?

9. Find by addition how many days of school in 11 weeks, if there are 5 days of school in one week.

10. Find by addition how many days there will probably be of your school during the present quarter or term.

11. Find by addition how many weeks in one year, if there are 4 weeks in one lunar month, and 13 lunar months in one year.

12. Find by addition how many cents there are in 19 half-dimes, if there are 5 cents in one half-dime.

NOTE.—In some questions it may be best, first to add all the tens of all the numbers; then all the units; then the sums of the tens and the units.

TWENTY-FIFTH LESSON.

Columns for Practice in Addition.

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
0	1	2	3	4	5	6	7	8	9	9	9	1	6	7
0	1	2	3	4	5	6	7	8	9	8	1_	2	5	2
0	1	2	3	4	5	6	7	8	9	7	8	7_	3	9
0	1	2	3	4	5	6	7	8	9	6	2_	5	4	4
0	1	2	3	4	5	6	7	8	9	5	7	3	8	5
0	1	2	3	4	5	6	7	8	9	4	3_	2_	7	6
0	1	2	3	4	5	6	7	8	9	3	6	0	9	3
0	1	2	3	4	5	6	7	8	9	2	4	4	1	8
0	1	2	3	4	5	6	7	8	9	1	0	6	2	1

(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)	(27)
3	9	1	9	3	6	4	9	1	3	9	1
0	6	2	1_	4	8	5	3	6	5	8	3
5	5_	4	8	9	2	3	7	0	1	7	8
0	4	5	2_	4	4_	2	5	4	7	6	6
4	3	6	7	7	7	7	1	5	9	5	5
0	2	2	3_	8	1	6	0	2	2	4	4
6	1_	8	4	4	3	1	8	3	8	3	9
0	7	5	6_	1	9_	5	4	7	4	2	2
7	3_	7	1	3	4	3	2	9	0	1	7
0	8	2	5	2	5	1	3	8	6	0	6
9	2_	1	2	1	1_	4	9	1	6	1	4
0	1	6	3	8	6	5	1	8	0	2	8
1	4	5	6	6	3	2	5	0	4	3	2
0	5_	2	3_	4	9	1	4	9	8	4	3
2	0	4	5	5	2_	8	3	6	2	5	7
0	8	3	2	1	0	2	7	7	9	6	1
8	2_	4	3_	5	7	7	0	3	7	7	5
0	5	6	0	0	3_	3	2	4	1	8	3
5	4	2	8	1	4	4	4	5	5	9	9
0	1	5	2	4	6	2	3	2	3	0	6

(28)	(30)	(33)
5	13	15
15_	17	15
6	15	12
14_	15	18
2	18	13
18_	12	17
3		
17_		
10		

(29)	(31)	(34)
	13	10
	17	20
	19	10
1	11	20
19	12	10
3	18	20
17		

(29)	(32)	(35)
6	11	40
14	29	20
5	23	10
15	27	20
10		

Note.— After needful explanations and varied practice, require the pupils to speak *only* the sums at the addition of each figure, or of the several figur *en masse* that make 10, 20, &c., till the columns can be thus added up down with correctness and rapidity.

TWENTY-SIXTH LESSON.

Subtracting 0 from 0 to 9 Inclusive.

1. If you have nothing in your pocket, and you take nothing out, what have you left in your pocket?

2. 0 from 0 leaves how many?

3. If you have one hat on your head, and you take none off, how many have you left on?

4. 0 from 1 leaves how many?

5. If you take nothing from any thing, what will remain? *Ans.* The same as before nothing was taken away.

6. If you take 0 from 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, what will be left? *Ans.* The same as before; or 0, 1, 2, 3, 4, 5, 6, 7, 8, 9.

Learn and recite this table.

	Outline Table.		Test Table.	
0 from 0 leaves 0; 0 from 0 leaves 0.	0	0	0	9
0 from 1 leaves 1; 1 from 1 leaves 0.	0	1	0	1
0 from 2 leaves 2; 2 from 2 leaves 0.	0	2	0	8
0 from 3 leaves 3; 3 from 3 leaves 0.	0	3	0	0
0 from 4 leaves 4; 4 from 4 leaves 0.	0	4	0	5
0 from 5 leaves 5; 5 from 5 leaves 0.	0	5	0	3
0 from 6 leaves 6; 6 from 6 leaves 0.	0	6	0	6
0 from 7 leaves 7; 7 from 7 leaves 0.	0	7	0	2
0 from 8 leaves 8; 8 from 8 leaves 0.	0	8	0	7
0 from 9 leaves 9; 9 from 9 leaves 0.	0	9	0	4

Slate Exercises.

0, 1, 2, 3, 4, 5, 6, 7, 8, 9. 9, 0, 8, 1, 7, 2, 5, 3, 6, 4.
0, 0, 0, 0, 0, 0, 0, 0, 0, 0. 0, 0, 0, 0, 0, 0, 0, 0, 0, 0.
0, 1, 2, 3, 4, 5, 6, 7, 8, 9. 9, 0, 8, 1, 7, 2, 5, 3, 6, 4.

7. What does this lesson show? *Ans.* It shows that nothing taken from any thing leaves that thing, and that 0 taken from any number leaves that number.

NOTE.— The outline table should be used as an aid in committing, and sometimes in reciting the regular table. The test table may be recited in full, and also by rapidly naming the results from top to bottom and from bottom to top of the table.

TWENTY-SEVENTH LESSON.

Subtracting 1, *&c.*

1. If there is no book on the table, and you take one off, how many are left?

2. 1 from 0 leaves how many?

3. Can any thing be taken from nothing?

4. Can 1, 2, 3, 4, 5, 6, 7, 8 or 9, be taken from 0.

5. If you have only one book on your desk, and you take two off, how many are left?

6. 2 from 1 leaves how many?

7. Can 3 be taken from 2? 4 from 3? 5 from 4? 6 from 5? 7 from 6? 8 from 7? 9 from 8?

8. Can any number be taken from a smaller number?

9. Can any number be taken from the same number?

10. If you take any thing from the same thing, what is left?

11. If you take any number from the same number, what is left?

12. What figure can you take or subtract from each of the ten figures?

13. From how many single figures can you subtract 1?

Learn and recite this table.

	Outline Table.		Test Table.	
1 from 1 leaves 0; 0 from 1 leaves 1.	1	1	1	4
1 from 2 leaves 1; 1 from 2 leaves 1.	1	2	1	9
1 from 3 leaves 2; 2 from 3 leaves 1.	1	3	1	6
1 from 4 leaves 3; 3 from 4 leaves 1.	1	4	1	10
1 from 5 leaves 4; 4 from 5 leaves 1.	1	5	1	5
1 from 6 leaves 5; 5 from 6 leaves 1.	1	6	1	7
1 from 7 leaves 6; 6 from 7 leaves 1.	1	7	1	2
1 from 8 leaves 7; 7 from 8 leaves 1.	1	8	1	8
1 from 9 leaves 8; 8 from 9 leaves 1.	1	9	1	3
1 from 10 leaves 9; 9 from 10 leaves 1.	1	10	1	1

Slide Exercises.	1, 2, 3, 4, 5, 6, 7, 8, 9, 10.	9, 7, 5, 3, 1, 8, 6, 4, 2, 10.
	1, 1, 1, 1, 1, 1, 1, 1, 1, 1.	1, 1, 1, 1, 1, 1, 1, 1, 1, 1.
	0, 1, 2, 3, 4, 5, 6, 7, 8, 9.	8, 6, 4, 2, 0, 7, 5, 3, 1, 9.

TWENTY-EIGHTH LESSON.

Subtracting 2, &c.

Learn and recite this table.

	Outline Table.		Test Table.	
2 from 2 leaves 0; 0 from 2 leaves 2.	2	2	2	5
2 from 3 leaves 1; 1 from 3 leaves 2.	2	3	2	3
2 from 4 leaves 2; 2 from 4 leaves 2.	2	4	2	9
2 from 5 leaves 3; 3 from 5 leaves 2.	2	5	2	7
2 from 6 leaves 4; 4 from 6 leaves 2.	2	6	2	6
2 from 7 leaves 5; 5 from 7 leaves 2.	2	7	2	10
2 from 8 leaves 6; 6 from 8 leaves 2.	2	8	2	2
2 from 9 leaves 7; 7 from 9 leaves 2.	2	9	2	11
2 from 10 leaves 8; 8 from 10 leaves 2.	2	10	2	4
2 from 11 leaves 9; 9 from 11 leaves 2.	2	11	2	8

Slate Exercises 8, 4, 11, 2, 9, 3, 6, 10, 7, 5.
to be completed. 2, 2, 2, 2, 2, 2, 2, 2, 2, 2.

1. A boy had 5 cents, and spent 2 of them for candy; how many had he left?

SOLUTION. *If a boy had* 5 *cents, and spent* 2 *of them for candy, he had left the difference between* 5 *cents and* 2 *cents; which is* 3 *cents. Therfore, if a boy had* 5 *cents, and spent* 2 *of them for candy, he had* 3 *cents left.*

2. John's mother gave him 7 cents; after paying 2 cents for slate pencils, how many had he left?

3. A man earned 11 dollars in a month, and saved all but 2 dollars; how much did he save?

4. A hen hatched 9 chickens, and raised all but 2 of them; how many did she raise?

5. If 2 figures are taken from the alphabet, how many figures remain?

6. If you have 6 lessons every day to learn, and you get all perfectly but 2, how many lessons do you learn perfectly every day?

7. If there are two girls in this class, and 8 boys, how many more boys are there in the class than girls?

8. 11 less 2, less 2, less 2, are how many?

TWENTY-NINTH LESSON.

Subtracting 3, *&c.*

Learn and recite this table.

	Outline Table.		Test Table.	
3 from 3 leaves 0; 0 from 3 leaves 3.	3	3	3	12
3 from 4 leaves 1; 1 from 4 leaves 3.	3	4	3	3
3 from 5 leaves 2; 2 from 5 leaves 3.	3	5	3	11
3 from 6 leaves 3; 3 from 6 leaves 3.	3	6	3	9
3 from 7 leaves 4; 4 from 7 leaves 3.	3	7	3	4
3 from 8 leaves 5; 5 from 8 leaves 3.	3	8	3	7
3 from 9 leaves 6; 6 from 9 leaves 3.	3	9	3	5
3 from 10 leaves 7; 7 from 10 leaves 3.	3	10	3	8
3 from 11 leaves 8; 8 from 11 leaves 3.	3	11	3	6
3 from 12 leaves 9; 9 from 12 leaves 3.	3	12	3	10

Slate Exercises 11, 3, 12, 9, 10, 6, 7, 5, 4, 8.
to be completed. 3, 3, 3, 3, 3, 3, 3, 3, 3, 3.

1. How many *lines* in most of the tables of this book?

2. Omitting the semicolons and periods, how many *columns* in each table?

3. What is the first column of the above table? second? third? fourth? fifth? sixth? seventh? eighth? ninth? tenth?

4. A boy had 4 slate pencils, and lost 3 of them; how many had he left?

5. A girl bought a dozen [12] eggs, and carelessly broke 3 of them; how many were whole?

6. George is 10 years old, and Mary is 3 years younger; how old is Mary?

7. Henry borrowed of me 6 cents, and has paid 3; how much does he yet owe?

8. If a man who had 5 dollars, should give 3 for a hat, how much would he have left?

9. John is 11 years old; how old was he 3 years ago?

NOTE.—It may make the pupils more observing, and thereby aid the memory, to require a description of the tables; also their transfer to the slate, if the pupil can write readily.

THIRTIETH LESSON.

Subtracting 4, &c.

Learn and recite this table.

	Outline Table.		Test Table.	
4 from 4 leaves 0; 0 from 4 leaves 4.	4	4	4	12
4 from 5 leaves 1; 1 from 5 leaves 4.	4	5	4	4
4 from 6 leaves 2; 2 from 6 leaves 4.	4	6	4	11
4 from 7 leaves 3; 3 from 7 leaves 4.	4	7	4	9
4 from 8 leaves 4; 4 from 8 leaves 4.	4	8	4	6
4 from 9 leaves 5; 5 from 9 leaves 4.	4	9	4	13
4 from 10 leaves 6; 6 from 10 leaves 4.	4	10	4	7
4 from 11 leaves 7; 7 from 11 leaves 4.	4	11	4	5
4 from 12 leaves 8; 8 from 12 leaves 4.	4	12	4	10
4 from 13 leaves 9; 9 from 13 leaves 4.	4	13	4	8

Slate Exercises 13, 4, 12, 5, 11, 6, 10, 8, 9. 7.
to be completed. 4, 4, 4, 4, 4, 4, 4, 4, 4, 4.

In describing the table, you may use the following or any other form:

The first column is 4, used 10 times; 2d, from, 10 times; 3d, is 4 to 13 inclusive; 4th, leaves, 10 times; 5th, the alphabet; 6th, the alphabet; 7th, from, 10 times; 8th, 4 to 13 inclusive; 9th, leaves, 10 times; 10th, 4, 10 times.

Or thus: 2 columns of 4; 2, of from; 2, of leaves; 2, of the alphabet; and 2 of 4 to 13 inclusive.

1. If there are 11 weeks in a school quarter, and 4 of them have passed away, how many weeks remain?

2. In a family of 9 children, there are 4 girls; how many boys?

3. Charles deposited 10 dollars in a savings bank, and has drawn out 4; how much remains his due?

4. A girl has 13 credit marks, and her brother has 4 less; how many has he?

5. If a man bought a dozen candles, and has burned 4 of them, how many has he left?

6. 4 apples from 8 apples, leaves how many apples?

THIRTY-FIRST LESSON.

Subtracting 5, *&c.*

Describe and recite this table.

	Outline Table.		Test Table.	
5 from 5 leaves 0; 0 from 5 leaves 5.	5	5	5	11
5 from 6 leaves 1; 1 from 6 leaves 5.	5	6	5	7
5 from 7 leaves 2; 2 from 7 leaves 5.	5	7	5	9
5 from 8 leaves 3; 3 from 8 leaves 5.	5	8	5	5
5 from 9 leaves 4; 4 from 9 leaves 5.	5	9	5	13
5 from 10 leaves 5; 5 from 10 leaves 5.	5	10	5	6
5 from 11 leaves 6; 6 from 11 leaves 5.	5	11	5	14
5 from 12 leaves 7; 7 from 12 leaves 5.	5	12	5	10
5 from 13 leaves 8; 8 from 13 leaves 5.	5	13	5	8
5 from 14 leaves 9; 9 from 14 leaves 5.	5	14	5	12

Slate Exercises 13, 7, 11, 5, 14, 9, 12, 8, 6, 10.
to be completed. 5, 5, 5, 5, 5, 5, 5, 5, 5, 5.

1. John's father gave him 10 cents, his mother gave him 3 more, and he found 1; he spent a half-dime for raisins; how much had he left?

2. A man earned 6 dollars one week, and 7 the next; he paid 5 dollars for his board; how much had he remaining?

3. A farmer has 4 cows in one pasture, and 6 in another; if he sells 5, how many will be left?

4. If you pick 2 peaches from one tree, 3 from another, and 4 from another; and then give away all but 5; how many do you give away?

5. Elsie was 7 years old 4 years ago; Martha is 5 years younger; what is Martha's age?

6. 1 and 2, and 3, and 5, and 2, less 5, are how many?

7. 8 and 6, less 5, less 4, less 2, less 1, are how many?

NOTE.— In this and the next four lessons, addition and subtraction are presented in such a variety of modes, that no forms of solution can easily be given; but it is hoped that the teacher will require correct and appropriate language, and such an explanation of each question, as will show that it is clearly understood by the pupil.

THIRTY-SECOND LESSON.

Subtracting 6, &c.

Describe and recite this table.

	Outline Table.		Test Table.	
6 from 6 leaves 0; 0 from 6 leaves 6.	6	6	6	15
6 from 7 leaves 1; 1 from 7 leaves 6.	6	7	6	7
6 from 8 leaves 2; 2 from 8 leaves 6.	6	8	6	13
6 from 9 leaves 3; 3 from 9 leaves 6.	6	9	6	6
6 from 10 leaves 4; 4 from 10 leaves 6.	6	10	6	14
6 from 11 leaves 5; 5 from 11 leaves 6.	6	11	6	8
6 from 12 leaves 6; 6 from 12 leaves 6.	6	12	6	11
6 from 13 leaves 7; 7 from 13 leaves 6.	6	13	6	9
6 from 14 leaves 8; 8 from 14 leaves 6.	6	14	6	10
6 from 15 leaves 9; 9 from 15 leaves 6.	6	15	6	12

Slate Exercises	13,	7,	14,	6,	12,	9,	15,	10,	8,	11.
to be completed.	6,	6,	6,	6,	6,	6,	6,	6,	6,	6.

1. A man bought a hat for 6 dollars, and handed the hatter a 10 dollar bill; with the change and a 5 dollar bill he bought a barrel of flour; when 6 dollars worth is eaten, what is the cost of the remainder?

2. A man earned 15 dollars, and was paid 6; he gave 3 dollars for a pair of boots, and 2 for a cap; he then earned two dollars more, and received all his wages remaining due; how much had he then?

3. If a boy buys one dozen oranges, eats 1, sells half a dozen, [6,] and gives away 2; then buys half a dozen, and sells 4 to one person, and 3 to another; how many has he left?

4. If I have 6 nuts in one hand, and 5 in the other, how much less have I in each hand, than in both?

5. From 9 and 5, take 6, and 1, and 6.

Note.— The pupil is expected, in his solution, to follow the question in the order in which the operations are mentioned, and give the result of each. Afterward he may be allowed or required, especially on a review, to give at once, the difference between the sums of the numbers to be added, and of those to be subtracted, provided the subtraction of so large a number has been explained.

THIRTY-THIRD LESSON.

Subtracting 7, &c.

Describe and recite this table.

	Outline Table.		Test Table.	
7 from 7 leaves 0; 0 from 7 leaves 7.	7	7	7	12
7 from 8 leaves 1; 1 from 8 leaves 7.	7	8	7	9
7 from 9 leaves 2; 2 from 9 leaves 7.	7	9	7	16
7 from 10 leaves 3; 3 from 10 leaves 7.	7	10	7	7
7 from 11 leaves 4; 4 from 11 leaves 7.	7	11	7	15
7 from 12 leaves 5; 5 from 12 leaves 7.	7	12	7	8
7 from 13 leaves 6; 6 from 13 leaves 7.	7	13	7	14
7 from 14 leaves 7; 7 from 14 leaves 7.	7	14	7	11.
7 from 15 leaves 8; 8 from 15 leaves 7.	7	15	7	13
7 from 16 leaves 9; 9 from 16 leaves 7.	7	16	7	10

Slate Exercises	14,	8,	10,	7,	13,	9,	12,	16,	11,	15.
to be completed.	7,	7,	7,	7,	7,	7,	7,	7,	7,	7.

Make this character [$] 20 times on your slate.

When this [$] is placed before a number in this book, read the number as though the word *dollar*, or *dollars*, was printed after it. Read these: $1; $10; $16; $25; $36; $45; $67; $99.

1. $7 and how many more dollars are $16?
2. $12 are how many dollars more than $7?
3. $7 are how many dollars less than $15?
4. A farmer sold to a grocer $6 worth of butter, and $5 worth of cheese; he bought goods to the amount of $7; how much money should he receive?
5. If a man has $3 in silver, $5 in gold, and $6 in bills, and buys a coat for $7, how much will he have left?
6. A fisherman caught 3 trout, 4 suckers, and 9 dace; after selling 7 of the fish, eating 3, and giving away 6, how many had he left?
7. A farmer carried 16 bushels of apples to the city; he sold 7 bushels to one person, 4 to another, and gave the remainder to the orphan asylum; how many bushels did he give away?

THIRTY-FOURTH LESSON.

Subtracting 8, *&c.*

Describe and recite this table.

	Outline Table.		Test Table.	
8 from 8 leaves 0; 0 from 8 leaves 8.	8	8	8	17
8 from 9 leaves 1; 1 from 9 leaves 8.	8	9	8	9
8 from 10 leaves 2; 2 from 10 leaves 8.	8	10	8	16
8 from 11 leaves 3; 3 from 11 leaves 8.	8	11	8	8
8 from 12 leaves 4; 4 from 12 leaves 8.	8	12	8	13
8 from 13 leaves 5; 5 from 13 leaves 8.	8	13	8	10
8 from 14 leaves 6; 6 from 14 leaves 8.	8	14	8	15
8 from 15 leaves 7; 7 from 15 leaves 8.	8	15	8	11
8 from 16 leaves 8; 8 from 16 leaves 8.	8	16	8	14
8 from 17 leaves 9; 9 from 17 leaves 8.	8	17	8	12

Slate Exercises	13,	9,	17,	11,	15,	10,	16,	10,	12,	14,	8.
to be completed.	8,	8,	8,	8,	8,	8,	8,	8,	8,	8,	8.

1. If you carry 2 pailfuls of water at one time, 3 at another, and 4 at another, how many more must you carry to make 17 pailfuls?

2. If it took 4 yards of woolen cloth for a man's coat, 3 for his pantaloons, 1 for his vest, and enough more for his son's suit to make 12 yards, how much in the son's suit, and how many yards less has the son than the father?

3. If there are 8 doors in the first story of our house, and enough more in the second to make 13, how many are there in the second story?

4. How many more in one story than in the other?

5. If you have 8 cents in one hand, and 15 in both, how many have you in the other hand, and how many more in one hand than in the other?

6. Thomas has 5 apples, Philip 3, and Jacob enough to make 10; how many has Jacob; how many has each less, if any, than each of the others, and how many has each less than all?

7. 1 and 2, and 3, and 4, and 5, less 8, less 2, less 3, are how many?

THIRTY-FIFTH LESSON.

Subtracting 9, &c.

Describe and recite this table.

	Outline Table.		Test Table.	
9 from 9 leaves 0; 0 from 9 leaves 9.	9	9	9	14
9 from 10 leaves 1; 1 from 10 leaves 9.	9	10	9	9
9 from 11 leaves 2; 2 from 11 leaves 9.	9	11	9	18
9 from 12 leaves 3; 3 from 12 leaves 9.	9	12	9	10
9 from 13 leaves 4; 4 from 13 leaves 9.	9	13	9	16
9 from 14 leaves 5; 5 from 14 leaves 9.	9	14	9	11
9 from 15 leaves 6; 6 from 15 leaves 9.	9	15	9	17
9 from 16 leaves 7; 7 from 16 leaves 9.	9	16	9	13
9 from 17 leaves 8; 8 from 17 leaves 9.	9	17	9	15
9 from 18 leaves 9; 9 from 18 leaves 9.	9	18	9	12

Slate Exercises 18, 11, 16, 13, 17, 14, 10, 15, 12, 9.
to be completed 9, 9, 9, 9, 9, 9, 9, 9, 9, 9.

1. From how many single figures can you subtract 9? from how many, 2? 8? 3? 7? 4? 6? 5?

2. A butcher bought a calf for $9, and a sheep for $8; how much less did the sheep cost than the calf, and how much less did each cost than both?

3. Father bought a firkin of butter for $4, a cheese for $3, a barrel of apples for $2, and potatoes enough to make $11; how much less did each cost, if any, than each of the others, and how much less did each cost than all?

4. Josephine is 8 years old, Catharine 7, Helen 6, and Amelia 2; how much older or younger is each, than each of the others?

5. How many answers has the last question?

6. A has $1, B $2, C $3, and D $4; how much less has each than all?

Note.— These questions use such small numbers, and so common objects, that they will become pleasing and profitable exercises to the pupil, if taught to obtain the answers from beginning to end in regular order, finishing satisfactorily each part of the question, before proceeding to the next; but if allowed to skip about promiscuously, confusion and uncertainty will be the inevitable result.

THIRTY-SIXTH LESSON.

General Review Table in Subtraction.

9	15	5	5	8	17	7	13	1	9	0	0	2	10	3	8	4	5	6	11
7	11	9	18	0	7	1	6	8	12	9	14	0	5	4	6	2	8	5	10
4	9	8	11	4	10	5	12	9	16	5	8	7	9	8	13	1	4	8	8
2	2	1	7	2	9	6	8	3	4	3	7	9	13	0	4	8	10	7	7
0	9	6	10	7	14	9	9	0	1	2	11	1	8	2	7	5	9	4	8
1	5	4	13	3	11	0	2	7	8	6	9	6	14	9	11	0	6	3	5
3	12	3	9	1	2	3	10	2	3	7	16	4	7	1	1	9	10	2	6
8	16	7	15	5	13	2	5	4	4	1	3	8	15	6	12	3	6	9	12
5	6	2	4	9	17	4	11	6	13	8	9	5	11	7	10	6	7	0	3
6	15	0	8	6	6	8	14	5	7	4	12	3	3	5	14	7	12	1	10

Note.—This table should be frequently read in columns and lines, by naming aloud *only* the difference between any two numbers given. The pupil who can read this whole table correctly in the least time, is most thoroughly master of subtraction.

Scholars, examine your subtraction tables, and make tables of combinations for subtraction, on your slates, in the form of the slate exercises, and then recite them.

Ten combinations 0, 1, 2, 3, 4, 5, 6, 7, 8, 9.
leave naught. 0, 1, 2, 3, 4, 5, 6, 7, 8, 9.
0, 0, 0, 0, 0, 0, 0, 0, 0, 0.

What 10 combinations leave 1? what, 2? what, 3? what, 4? what, 5? what, 6? what, 7? what, 8? what, 9?

Take any two single figures, and add and subtract them both ways, as in the addition and subtraction tables. The *sum* in addition, will be the number after the word *from* in subtraction.

8 9

8 and 9 are 17; 9 and 8 are 17.
8 from 17 leaves 9; 9 from 17 leaves 8.

Recite thus, 1 and 6, 9 and 7, 8 and 5, 9 and 4, 3 and 7.

THIRTY-SEVENTH LESSON.

Subtracting one figure from two figures.

1. What 1 figure have you learned from the tables to subtract from 18? what 2, from 17? what 3, from 16? what 4, from 15? what 5, from 14? what 6, from 13? what 7, from 12? what 8, from 11? what 9, from 10?

You must now learn to subtract each of the ten figures from each of these numbers; and also from every number from 10 to 99 inclusive.

2. 18 less 3 are how many?

SOLUTION. 18 *is* 1 *ten and* 8 *units.* 3 *units from* 8 *units leaves* 5 *units.* 1 *ten and* 5 *units are* 15. *Therefore* 18 *less* 3 *are* 15.

3. 97 less 6 are how many?

BLANK SOLUTION. — *is* — *ten* (*s*) *and* — *unit* (*s*). — *unit* (*s*) *from* — *unit* (*s*) *leaves* — *unit* (*s*). — *ten* (*s*) *and* — *unit* (*s*) *are* —. *Therefore* — *less* — *are* —.

4. 45 less 4 are how many?
5. 79 less 7 are how many?
6. 36 less 5 are how many?

When the unit figure of the smaller number exceeds the unit figure of the larger number, you may call the units of the larger number 10 more, and the tens 1 less, than you would otherwise. Then solve as above.

7. 45 less 6 are how many? [3 tens and 15 units.]
8. 36 less 7 are how many? [2 tens and 16 units.]
9. 52 less 4 are how many? [4 tens and 12 units.]
10. 63 less 5 are how many? [5 tens and 13 units.]
11. 74 less 9 are how many? [6 tens and 14 units.]
12. 85 less 8 are how many? [7 tens and 15 units.]
13. 23 less 2 are how many? 23 less 4?
14. 32 less 3 are how many? 32 less 1?
15. 48 less 5 are how many? 48 less 9?
16. 53 less 7 are how many? 53 less 1?
17. 69 less 6 are how many? 69 less 9?

THIRTY-EIGHTH LESSON.

Subtracting two figures from two figures.

1. 24 from 36 leaves how many?

SOLUTION. 24 *is* 2 *tens and* 4 *units.* 36 *is* 3 *tens and* 6 *units.* 4 *units from* 6 *units leaves* 2 *units.* 2 *tens from* 3 *tens leaves* 1 *ten.* 1 *ten and* 2 *units are* 12. *Therefore* 24 *from* 36 *leaves* 12.

2. 45 from 98 leaves how many?

BLANK SOLUTION. — *is* — *ten* (*s*) *and* — *unit* (*s*). — *is* — *ten* (*s*) *and* — *unit* (*s*). — *unit* (*s*) *from* — *unit* (*s*) *leaves* — *unit* (*s*). — *ten* (*s*) *from* — *ten* (*s*) *leaves* — *ten* (*s*). — *ten* (*s*) *and* — *unit* (*s*) *are* —. *Therefore* — *from* — *leaves* ——.

3. 53 from 87 leaves how many?
4. 32 from 49 leaves how many?
5. 61 from 94 leaves how many?
6. 76 from 97 leaves how many?
7. 13 from 25 leaves how many?
8. 21 from 42 leaves how many?
9. 15 from 27 leaves how many?
10. 14 from 99 leaves how many?

When the unit figure of the smaller number exceeds the unit figure of the larger number, you may call the units of the larger number 10 more, and the tens 1 less, than you would otherwise. Then solve as above.

11. 13 from 22 leaves how many? [1 ten and 12 units.]
12. 21 from 33 leaves how many? [2 tens and 13 units.]
13. 35 from 43 leaves how many? [3 tens and 13 units.]
14. 46 from 54 leaves how many? [4 tens and 14 units.]
15. 57 from 65 leaves how many? [5 tens and 15 units.]
16. If you wish to take 73 from 96, how will you analyze 96? if 78 from 96, how?
17. If you wish to take 36 from 47, how will you analyze 47? if 39 from 47, how?
18. 16 from 25 leaves how many? 16 from 27?

THIRTY-NINTH LESSON.

Multiplication of and by 0.

— is 0.	–	is 0.
— “ 0.	0	“ 0.
— “ 0.	0 0	are 0.
— “ 0.	0 0 0	“ 0.
— “ 0.	0 0 0 0	“ 0.
— “ 0.	0 0 0 0 0	“ 0.
— “ 0.	0 0 0 0 0 0	“ 0.
— “ 0.	0 0 0 0 0 0 0	“ 0.
— “ 0.	0 0 0 0 0 0 0 0	“ 0.
— “ 0.	0 0 0 0 0 0 0 0 0	“ 0.

Describe and recite this table.	Outline Table.		Test Table.	
0 times 0 are 0; 0 times 0 are 0.	0	0	9	0
0 times 1 are 0; 1 time 0 is 0.	0	1	0	0
0 times 2 are 0; 2 times 0 are 0.	0	2	1	0
0 times 3 are 0; 3 times 0 are 0.	0	3	0	5
0 times 4 are 0; 4 times 0 are 0.	0	4	7	0
0 times 5 are 0; 5 times 0 are 0.	0	5	0	3
0 times 6 are 0; 6 times 0 are 0.	0	6	6	0
0 times 7 are 0; 7 times 0 are 0.	0	7	0	4
0 times 8 are 0; 8 times 0 are 0.	0	8	2	0
0 times 9 are 0; 9 times 0 are 0.	0	9	0	8

1. Which is most,—0, 1, 2, 3, 4, 5, 6, 7, 8 or 9 times 0?
2. How many times nothing will make something?
3. How many times naught will make 1?
4. If I have learned nothing at school every day for 10 days, how much have I learned at school at the close of each day?
5. If there are on the table, in separate piles, 0, 1, 2, 3, 4, 5, 6, 7, 8, 9 cents, and I put each pile into my pocket no times, how many cents do I put into my pocket from each pile?

Note.—Multiplication is often called a short method of performing many additions; and in this work, the pupil is expected first to obtain the results of each multiplication table by addition. In this way the pupil will see *why* the results of the multiplication table are obtained, instead of depending merely on the *ipse dixit* of his book.

No times any figure is represented by a dash [—].

FORTIETH LESSON.

Multiplication of and by 1.

One 0 is 0.	–	No one	is 0.
" 1 " 1.	1	One one	" 1.
" 2 " 2.	1 1	Two ones	are 2.
" 3 " 3.	1 1 1	Three ones	" 3.
" 4 " 4.	1 1 1 1		" 4.
" 5 " 5.	1 1 1 1 1		" 5.
" 6 " 6.	1 1 1 1 1 1		" 6.
" 7 " 7.	1 1 1 1 1 1 1		" 7.
" 8 " 8.	1 1 1 1 1 1 1 1		" 8.
" 9 " 9.	1 1 1 1 1 1 1 1 1		" 9.

Describe and recite this table.	Outline Table.		Test Table.	
1 time 0 is 0; 0 times 1 are 0.	1	0	7	1
1 time 1 is 1; 1 time 1 is 1.	1	1	1	0
1 time 2 is 2; 2 times 1 are 2.	1	2	4	1
1 time 3 is 3; 3 times 1 are 3.	1	3	1	6
1 time 4 is 4; 4 times 1 are 4.	1	4	5	1
1 time 5 is 5; 5 times 1 are 5.	1	5	1	3
1 time 6 is 6; 6 times 1 are 6.	1	6	8	1
1 time 7 is 7; 7 times 1 are 7.	1	7	1	2
1 time 8 is 8; 8 times 1 are 8.	1	8	9	1
1 time 9 is 9; 9 times 1 are 9.	1	9	1	1

S. E. to be finished.

0, 9, 1, 8, 2, 7, 3, 6, 5, 4.	1, 1, 1, 1, 1, 1, 1, 1, 1, 1.
1, 1, 1, 1, 1, 1, 1, 1, 1, 1.	9, 0, 7, 6, 4, 3, 8, 5, 1, 2.

1. What is once any thing, or any number? *Ans.* That thing or number.

2. What do 9 apples cost, at 1 cent each?

Solution. *If* 1 *apple costs* 1 *cent,* 9 *apples will cost* 9 *times* 1 *cent, which are* 9 *cents. Therefore* 9 *apples, at* 1 *cent each, cost* 9 *cents.*

Solution by Addition. *If* 1 *apple costs* 1 *cent,* 9 *apples will cost* 1 *cent added to itself* 9 *times.* 1 *and* 1 *are* 2, *and* 1 *are* 3, *and* 1 *are* 4, *and* 1 *are* 5, *and* 1 *are* 6, *and* 1 *are* 7, *and* 1 *are* 8, *and* 1 *are* 9. *Therefore* 9 *apples, &c.*

FORTY-FIRST LESSON.

Multiplication of and by 2.

0	0	are	0.	–									is	0.
1	1	"	2.	2									"	2.
2	2	"	4.	2	2								are	4.
3	3	"	6.	2	2	2							"	6.
4	4	"	8.	2	2	2	2						"	8.
5	5	"	10.	2	2	2	2	2					"	10.
6	6	"	12.	2	2	2	2	2	2				"	12.
7	7	"	14.	2	2	2	2	2	2	2			"	14.
8	8	"	16.	2	2	2	2	2	2	2	2		"	16.
9	9	"	18.	2	2	2	2	2	2	2	2	2	"	18.

Describe and recite this table.		Outline Table.		Test Table.	
2 times 0 are 0;	0 times 2 are 0.	2	0	2	7
2 times 1 are 2;	1 time 2 is 2.	2	1	4	2
2 times 2 are 4;	2 times 2 are 4.	2	2	2	9
2 times 3 are 6;	3 times 2 are 6.	2	3	6	2
2 times 4 are 8;	4 times 2 are 8.	2	4	2	0
2 times 5 are 10;	5 times 2 are 10.	2	5	3	2
2 times 6 are 12;	6 times 2 are 12.	2	6	2	1
2 times 7 are 14;	7 times 2 are 14.	2	7	5	2
2 times 8 are 16;	8 times 2 are 16.	2	8	2	2
2 times 9 are 18;	9 times 2 are 18.	2	9	8	2

S. E. to be finished.

0, 2, 4, 6, 8, 1, 3, 5, 7, 9.   2, 2, 2, 2, 2, 2, 2, 2, 2, 2.
2, 2, 2, 2, 2, 2, 2, 2, 2, 2.   0, 9, 7, 5, 3, 1, 8, 6, 2, 4.

1. Write on your slates the sums of 2, up to 98. Thus: 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, &c.

2. Recite the products of this table from 0 to 18, and back.

3. How many, and what figures of the alphabet are odd? *Ans.* Five; 1, 3, 5, 7, 9. All numbers ending with 1, 3, 5, 7 or 9, are also odd.

4. How many, and what figures of the alphabet are even? *Ans.* Five; 0, 2, 4, 6, 8. All numbers ending with 0, 2, 4, 6 or 8, are also even.

NOTE.—Naught, strictly speaking, represents the absence of a number; but as it changes any odd number to an even one, no less than 2, 4, 6 or 8, when placed at its right, it may practically be considered an even figure.

FORTY-SECOND LESSON.

Multiplication of and by 3.

0	0	0	are	0.	–									is	0.
1	1	1	"	3.	3									"	3.
2	2	2	"	6.	3	3								are	6.
3	3	3	"	9.	3	3	3							"	9.
4	4	4	"	12.	3	3	3	3						"	12.
5	5	5	"	15.	3	3	3	3	3					"	15.
6	6	6	"	18.	3	3	3	3	3	3				"	18.
7	7	7	"	21.	3	3	3	3	3	3	3			"	21.
8	8	8	"	24.	3	3	3	3	3	3	3	3		"	24.
9	9	9	"	27.	3	3	3	3	3	3	3	3	3	"	27.

Describe and recite this table.		Outline Table.		Test Table.	
3 times 0 are 0;	0 times 3 are 0.	3	0	3	6
3 times 1 are 3;	1 time 3 is 3.	3	1	4	3
3 times 2 are 6;	2 times 3 are 6.	3	2	3	2
3 times 3 are 9;	3 times 3 are 9.	3	3	0	3
3 times 4 are 12;	4 times 3 are 12.	3	4	3	9
3 times 5 are 15;	5 times 3 are 15.	3	5	7	3
3 times 6 are 18;	6 times 3 are 18.	3	6	3	5
3 times 7 are 21;	7 times 3 are 21.	3	7	8	3
3 times 8 are 24;	8 times 3 are 24.	3	8	3	1
3 times 9 are 27;	9 times 3 are 27.	3	9	3	3

S. E. to be finished.

3, 3, 3, 3, 3, 3, 3, 3, 3, 3.   9, 0, 5, 7, 1, 3, 4, 2, 8, 6.
0, 9, 7, 5, 3, 1, 8, 4, 6, 1.   3, 3, 3, 3, 3, 3, 3, 3, 3, 3.

1. Are the sums and products of 3 odd or even?

Learn and recite the following six sentences.

Even numbers added to even numbers make even numbers.
Odd numbers added to odd numbers make even numbers.
Odd numbers added to even numbers make odd numbers.
Even numbers multiplied by even numbers make even numbers.
Odd numbers multiplied by even numbers make even numbers.
Odd numbers multiplied by odd numbers make odd numbers.

FORTY-THIRD LESSON.

Multiplication of and by 4.

0 0 0 0	are	0.	—	is	0.
1 1 1 1	"	4.	4	"	4.
2 2 2 2	"	8.	4 4	are	8.
3 3 3 3	"	12.	4 4 4	"	12.
4 4 4 4	"	16.	4 4 4 4	"	16.
5 5 5 5	"	20.	4 4 4 4 4	"	20.
6 6 6 6	"	24.	4 4 4 4 4 4	"	24.
7 7 7 7	"	28.	4 4 4 4 4 4 4	"	28.
8 8 8 8	"	32.	4 4 4 4 4 4 4 4	"	32.
9 9 9 9	"	36.	4 4 4 4 4 4 4 4 4	"	36.

Describe and recite this table.

		Outline Table.		Test Table.	
4 times 0 are 0;	0 times 4 are 0.	4	0	4	1
4 times 1 are 4;	1 time 4 is 4.	4	1	8	4
4 times 2 are 8;	2 times 4 are 8.	4	2	4	5
4 times 3 are 12;	3 times 4 are 12.	4	3	0	4
4 times 4 are 16;	4 times 4 are 16.	4	4	4	2
4 times 5 are 20;	5 times 4 are 20.	4	5	6	4
4 times 6 are 24;	6 times 4 are 24.	4	6	4	9
4 times 7 are 28;	7 times 4 are 28.	4	7	7	4
4 times 8 are 32;	8 times 4 are 32.	4	8	4	3
4 times 9 are 36;	9 times 4 are 36.	4	9	4	4

S. E. to be finished.

9, 0, 1, 8, 2, 7, 3, 6, 4, 5.
4, 4, 4, 4, 4, 4, 4, 4, 4, 4.

4, 4, 4, 4, 4, 4, 4, 4, 4, 4.
1, 0, 8, 7, 5, 3, 6, 9, 2, 4.

Scholars should obtain the results of each multiplication table on their slates, by addition, in the following form:

0	1	2	3	4	5	6	7	8	9
0	1	2	3	4	5	6	7	8	9
0	2	4	6	8	10	12	14	16	18
0	1	2	3	4	5	6	7	8	9
0	3	6	9	12	15	18	21	24	27
0	1	2	3	4	5	6	7	8	9
0	4	8	12	16	20	24	28	32	36

FORTY-FOURTH LESSON.

Multiplication of and by 5.

0 0 0 0 0	are	0.	–	is	0.
1 1 1 1 1	"	5.	5	"	5.
2 2 2 2 2	"	10.	5 5	are	10.
3 3 3 3 3	"	15.	5 5 5	"	15.
4 4 4 4 4	"	20.	5 5 5 5	"	20.
5 5 5 5 5	"	25.	5 5 5 5 5	"	25.
6 6 6 6 6	"	30.	5 5 5 5 5 5	"	30.
7 7 7 7 7	"	35.	5 5 5 5 5 5 5	"	35.
8 8 8 8 8	"	40.	5 5 5 5 5 5 5 5	"	40.
9 9 9 9 9	"	45.	5 5 5 5 5 5 5 5 5	"	45.

Describe and recite this table.		Outline Table.		Test Table.	
5 times 0 are 0;	0 times 5 are 0.	5	0	6	5
5 times 1 are 5;	1 time 5 is 5.	5	1	5	9
5 times 2 are 10;	2 times 5 are 10.	5	2	0	5
5 times 3 are 15;	3 times 5 are 15.	5	3	5	8
5 times 4 are 20;	4 times 5 are 20.	5	4	3	5
5 times 5 are 25;	5 times 5 are 25.	5	5	5	2
5 times 6 are 30;	6 times 5 are 30.	5	6	7	5
5 times 7 are 35;	7 times 5 are 35.	5	7	5	4
5 times 8 are 40;	8 times 5 are 40.	5	8	1	5
5 times 9 are 45;	9 times 5 are 45.	5	9	5	5

S. E. to be finished.

1, 0, 3, 2, 4, 6, 5, 7, 9, 8.	5, 5, 5, 5, 5, 5, 5, 5, 5, 5.
5, 5, 5, 5, 5, 5, 5, 5, 5, 5.	0, 9, 8, 1, 4, 3, 7, 2, 6, 5.

1. Recite the products of this table from 0 to 45, and back.
2. Write the sums of 5, up to 95.
3. What are the only right-hand figures of the sums of 5?
4. Are 1, 3, 5, 7, 9 times 5, odd or even?
5. What cost 4 oranges at 5 cents apiece?
6. If 9 boys have each 5 peaches, how many have all?
7. If 8 scholars have each 5 books, how many have all?
8. If a man walks 4 miles in 1 hour, how many does he walk in 6 hours?
9. 5 times 5 and 3 times 4 are how many?
10. 5 times 6 and 6 times 3 are how many?

FORTY-FIFTH LESSON.

Multiplication of and by 6.

0 0 0 0 0 0	are	0.	–	is	0.
1 1 1 1 1 1	"	6.	6	"	6.
2 2 2 2 2 2	"	12.	6 6	are	12.
3 3 3 3 3 3	"	18.	6 6 6	"	18.
4 4 4 4 4 4	"	24.	6 6 6 6	"	24.
5 5 5 5 5 5	"	30.	6 6 6 6 6	"	30.
6 6 6 6 6 6	"	36.	6 6 6 6 6 6	"	36.
7 7 7 7 7 7	"	42.	6 6 6 6 6 6 6	"	42.
8 8 8 8 8 8	"	48.	6 6 6 6 6 6 6 6	"	48.
9 9 9 9 9 9	"	54.	6 6 6 6 6 6 6 6 6	"	54.

Describe and recite this table.	Outline Table.		Test Table.	
6 times 0 are 0; 0 times 6 are 0.	6	0	4	6
6 times 1 are 6; 1 time 6 is 6.	6	1	6	8
6 times 2 are 12; 2 times 6 are 12.	6	2	2	6
6 times 3 are 18; 3 times 6 are 18.	6	3	6	6
6 times 4 are 24; 4 times 6 are 24.	6	4	0	6
6 times 5 are 30; 5 times 6 are 30.	6	5	6	9
6 times 6 are 36; 6 times 6 are 36.	6	6	5	6
6 times 7 are 42; 7 times 6 are 42.	6	7	6	7
6 times 8 are 48; 8 times 6 are 48.	6	8	3	6
6 times 9 are 54; 9 times 6 are 54.	6	9	6	1

S. E. to be finished.

4, 9, 1, 6, 2, 3, 0, 5, 7, 8.
6, 6, 6, 6, 6, 6, 6, 6, 6, 6.

6, 6, 6, 6, 6, 6, 6, 6, 6, 6.
8, 4, 6, 2, 0, 9, 1, 3, 7, 5.

1. Write the sums of 6, up to 96.
2. Recite the products of this table from 0 to 54, and back.
3. Are these numbers odd or even?
4. How much will 7 papers of pins cost, at 6 cents each?
5. What cost 9 quarts of cherries, at 6 cents a quart?
6. What cost 8 window panes, at 6 cents a pane?
7. If you have 6 hours of school in one day, how many hours of school during the 5 days of each week?
8. If a man earn 6 shillings a day, how many shillings does he earn during the working days of each week?
9. 6 times 4 and 3 times 6 are how many?

FORTY-SIXTH LESSON.

Multiplication of and by 7.

0 0 0 0 0 0 0	are	0.		is	0.
1 1 1 1 1 1 1	"	7.	7	"	7.
2 2 2 2 2 2 2	"	14.	7 7	are	14.
3 3 3 3 3 3 3	"	21.	7 7 7	"	21.
4 4 4 4 4 4 4	"	28.	7 7 7 7	"	28.
5 5 5 5 5 5 5	"	35.	7 7 7 7 7	"	35.
6 6 6 6 6 6 6	"	42.	7 7 7 7 7 7	"	42.
7 7 7 7 7 7 7	"	49.	7 7 7 7 7 7 7	"	49.
8 8 8 8 8 8 8	"	56.	7 7 7 7 7 7 7 7	"	56.
9 9 9 9 9 9 9	"	63.	7 7 7 7 7 7 7 7 7	"	63.

Describe and recite this table.	Outline Table.		Test Table.	
7 times 0 are 0; 0 times 7 are 0.	7	0	5	7
7 times 1 are 7; 1 time 7 is 7.	7	1	7	9
7 times 2 are 14; 2 times 7 are 14.	7	2	0	7
7 times 3 are 21; 3 times 7 are 21.	7	3	7	7
7 times 4 are 28; 4 times 7 are 28.	7	4	3	7
7 times 5 are 35; 5 times 7 are 35.	7	5	7	2
7 times 6 are 42; 6 times 7 are 42.	7	6	8	7
7 times 7 are 49; 7 times 7 are 49.	7	7	7	6
7 times 8 are 56; 8 times 7 are 56.	7	8	4	7
7 times 9 are 63; 9 times 7 are 63.	7	9	7	1

S. E. to be finished.

0, 6, 4, 2, 8, 9, 7, 5, 3, 1.   7, 7, 7, 7, 7, 7, 7, 7, 7, 7.
7, 7, 7, 7, 7, 7, 7, 7, 7, 7.   0, 4, 6, 2, 8, 7, 9, 5, 1, 3.

1. Write the sums of 7, up to 98.
2. Recite the products of 7 from 0 to 63, and back.

Scholars, you should learn, by study and recitation, to add very rapidly the figures in lines at the top of each of these pages, without naming any of the figures except the first. For example, add the last of the above lines thus: 9, 18, 27, 36, 45, 54, 63:—7, 14, 21, 28, 35, 42, 49, 56, 63, Read the lines thus: 7 nines are 63: 9 sevens are 63. Add and read every line heading these multiplication tables till an add and read them correctly without hesitation.

FORTY-SEVENTH LESSON.

Multiplication of and by 8.

0 0 0 0 0 0 0 0 are 0. – is 0.
1 1 1 1 1 1 1 1 " 8. 8 " 8.
2 2 2 2 2 2 2 2 " 16. 8 8 are 16.
3 3 3 3 3 3 3 3 " 24. 8 8 8 " 24.
4 4 4 4 4 4 4 4 " 32. 8 8 8 8 " 32.
5 5 5 5 5 5 5 5 " 40. 8 8 8 8 8 " 40.
6 6 6 6 6 6 6 6 " 48. 8 8 8 8 8 8 " 48.
7 7 7 7 7 7 7 7 " 56. 8 8 8 8 8 8 8 " 56.
8 8 8 8 8 8 8 8 " 64. 8 8 8 8 8 8 8 8 " 64.
9 9 9 9 9 9 9 9 " 72. 8 8 8 8 8 8 8 8 8 " 72.

Describe and recite this table.	Outline Table.		Test Table.	
8 times 0 are 0; 0 times 8 are 0.	8	0	1	8
8 times 1 are 8; 1 time 8 is 8.	8	1	8	0
8 times 2 are 16; 2 times 8 are 16.	8	2	3	8
8 times 3 are 24; 3 times 8 are 24.	8	3	8	2
8 times 4 are 32; 4 times 8 are 32.	8	4	5	8
8 times 5 are 40; 5 times 8 are 40.	8	5	8	4
8 times 6 are 48; 6 times 8 are 48.	8	6	7	8
8 times 7 are 56; 7 times 8 are 56.	8	7	8	6
8 times 8 are 64; 8 times 8 are 64.	8	8	9	8
8 times 9 are 72; 9 times 8 are 72.	8	9	8	8

S. E. to be finished.

1, 0, 3, 5, 2, 4, 7, 9, 6, 8.   8, 8, 8, 8, 8, 8, 8, 8, 8, 8.
8, 8, 8, 8, 8, 8, 8, 8, 8, 8.   3, 1, 0, 2, 8, 5, 7, 4, 9, 6.

1. Recite the products of this table from 0 to 72 and back.
2. Write the sums of 8, up to 96.
3. Which is most, 8 nines, 9 eighths, 8 times 9, or 9 times 8?
4. 8 ones and 8 times 4 are how many?
5. 8 twos and 8 times 3 are how many?
6. 8 fours and 8 times 4 are how many?
7. 8 fives and 8 times 5 are how many?
8. 8 sixes and 8 times 6 are how many?
9. 8 sevens and 8 twos are how many?
10. 6 times 7 and 4 times 5 are how many?

FORTY-EIGHTH LESSON.

Multiplication of and by 9.

0 0 0 0 0 0 0 0 0	are	0.	–	is	0.
1 1 1 1 1 1 1 1 1	“	9.	9	“	9.
2 2 2 2 2 2 2 2 2	“	18.	9 9	are	18.
3 3 3 3 3 3 3 3 3	“	27.	9 9 9	“	27.
4 4 4 4 4 4 4 4 4	“	36.	9 9 9 9	“	36.
5 5 5 5 5 5 5 5 5	“	45.	9 9 9 9 9	“	45.
6 6 6 6 6 6 6 6 6	“	54.	9 9 9 9 9 9	“	54.
7 7 7 7 7 7 7 7 7	“	63.	9 9 9 9 9 9 9	“	63.
8 8 8 8 8 8 8 8 8	“	72.	9 9 9 9 9 9 9 9	“	72.
9 9 9 9 9 9 9 9 9	“	81.	9 9 9 9 9 9 9 9 9	“	81.

Describe and recite this table.	Outline Table.		Test Table.	
9 times 0 are 0; 0 times 9 are 0.	9	0	9	8
9 times 1 are 9; 1 time 9 is 9.	9	1	6	9
9 times 2 are 18; 2 times 9 are 18.	9	2	9	4
9 times 3 are 27; 3 times 9 are 27.	9	3	2	9
9 times 4 are 36; 4 times 9 are 36.	9	4	9	9
9 times 5 are 45; 5 times 9 are 45.	9	5	7	9
9 times 6 are 54; 6 times 9 are 54.	9	6	9	5
9 times 7 are 63; 7 times 9 are 63.	9	7	3	9
9 times 8 are 72; 8 times 9 are 72.	9	8	9	0
9 times 9 are 81; 9 times 9 are 81.	9	9	1	9

S. E. to be finished.

9, 0, 1, 7, 5, 3, 2, 6, 8, 4.	9, 9, 9, 9, 9, 9, 9, 9, 9, 9.
9, 9, 9, 9, 9, 9, 9, 9, 9, 9.	9, 3, 0, 5, 1, 7, 2, 8, 6, 4.

1. Recite the products of this table from 9 to 81 and back.
2. Write the sums of 9, up to 99.
3. Are the sums of these numbers odd or even?
4. What cost 9 dozen eggs, at 9 cents a dozen?
5. What cost 5 pounds of cheese, at 9 cents a pound?
6. Nine cords of wood, at $4 a cord, cost how much?
7. Four barrels of flour, at $9 a barrel, cost how much?
8. What cost 7 yards of calico, at 9 cents a yard?
9. Nine yards of broadcloth, at $3 a yard, cost how much?
10. Have you added all the lines of figures, heading these multiplication tables?

FORTY-NINTH LESSON.

General Review Table in Multiplication, &c.

2 9	7 5	0 2	6 6	9 2	0 5	3 3	4 2	9 0	2 3
3 0	2 0	3 1	8 1	4 5	6 8	1 6	9 9	4 1	4 0
7 6	3 9	2 8	7 3	3 2	3 7	8 5	0 7	0 8	3 5
5 9	4 8	1 2	2 1	1 4	8 9	9 1	8 8	5 3	1 9
1 0	8 3	5 7	5 6	2 7	2 2	7 0	6 0	7 8	5 4
8 4	1 1	9 3	9 7	8 0	9 8	5 1	7 7	6 1	0 9
4 9	6 4	4 7	3 8	7 2	5 0	2 6	5 2	8 6	8 7
6 3	9 5	6 5	1 3	0 4	7 1	6 9	1 7	2 5	3 6
9 4	0 1	8 2	4 6	6 7	4 4	4 3	2 4	1 8	7 9
0 0	5 8	7 4	0 3	5 5	1 5	0 6	3 6	3 4	6 2

Scholars, study this table till you can read it very rapidly in columns or lines, by naming aloud only the results. The one who can do this correctly in the least time, is most thoroughly master of multiplication.

Examine your multiplication tables, and make tables of combinations for multiplication, on your slates, in the form of the slate exercises, and then recite them. 1, 25, 49, 64, 81, have each but one combination. What are they? 2, 3, 5, 7, 10, 14, 15, 20, 21, 27, 28, 30, 32, 35, 40, 42, 45, 48, 54, 56, 63, 72, have each two combinations. What are they? 4, 9, 16, 36, have each three combinations. What are they? 6, 8, 12, 18, 24, have each four combinations. What are they? 18 combinations make 0. What are they?

Combinations	1, 5, 7, 8, 9.	2, 1, 3, 1, 5, 1.
in	1, 5, 7, 8, 9.	1, 2, 1, 3, 1, 5. &c.
multiplication.	1, 25, 49, 64, 81.	2, 2, 3, 3, 5, 5.

Write any two single figures. Add, subtract and multiply as in the tables.

7 6

7 and 6 are 13; 6 and 7 are 13.
7 from 13 leaves 6; 6 from 13 leaves 7.
7 times 6 are 42; 6 times 7 are 42.

FIFTIETH LESSON.

Multiplication of two figures by one figure.

1. 2 times 28 or 28 times 2 are how many?

SOLUTION. 28 *is* 2 *tens and* 8 *units.* 2 *times* 2 *tens are* 4 *tens.* 2 *times* 8 *units are* 16 *units, which are* 1 *ten and* 6 *units.* 4 *tens and* 1 *ten are* 5 *tens.* 5 *tens and* 6 *units are* 56. *Therefore* 2 *times* 28 *are* 56.

2. 4 times 23 or 23 times 4 are how many?

BLANK SOLUTION. — *is* — *tens and* — *units.* — *times* — *tens are* — *tens.* — *times* — *units are* — *units, which are* — *tens and* — *units.* — *tens and* — *tens are* — *tens.* — *tens and* — *units are* — *Therefore* — *times* — *are* ——.

You can judge by the sound, whether S should be added to the words *ten* and *unit* or not.

3. 3 times 33 or 33 times 3 are how many?
4. 4 times 22 or 22 times 4 are how many?
5. 2 times 44 or 44 times 2 are how many?
6. 9 times 11 or 11 times 9 are how many?
7. 8 times 12 or 12 times 8 are how many?
8. 6 times 16 or 16 times 6 are how many?
9. 7 times 13 or 13 times 7 are how many?
10. 5 times 16 or 16 times 5 are how many?
11. 5 times 19 or 19 times 5 are how many?
12. 7 times 14 or 14 times 7 are how many?
13. 6 times 15 or 15 times 6 are how many?
14. 3 times 29 or 29 times 3 are how many?

Work the following examples on your slates as they are here done, by marking the figure in the tens place, and writing the product of this and the single figure at its left, which, with the naught, forms the whole product.

9 times 10 are [9 ~~1~~0] 90. 8 times 10 are [8 ~~1~~0] 80.
4 times 20 are [8 ~~2~~0] 80. 3 times 30 are [9 ~~3~~0] 90.
2 times 40 are [8 ~~4~~0] 80. 3 times 20 are [6 ~~2~~0] 60.

Work the same examples on your slates, by rubbing out the tens figure, and writing the product of this figure and the single figure at the left of 0.

FIFTY-FIRST LESSON.

Practical Questions in Multiplication, &c.

1. What cost 3 bushels of apples, at 25 cents a bushel?

2. Two cows, at $36 each, cost how much?

3. How much will 4 chickens cost, at 19 cents apiece?

4. What cost 3 acres of land, at $28 an acre?

5. If a man receives $18 a month, how much will he receive in 5 months?

6. If a woman receives $6 a month, how much would she receive in 12 months, or one year?

7. If a man walks 16 miles each day, how far would he walk during the 6 working-days of one week?

8. If a boy solves 15 questions in arithmetic each day, how many will he solve in 5 days?

9. If 12 things make a dozen, how many make 8 dozen?

10. In one day and night are 24 hours; how many hours in four days and nights?

11. A farmer sold 6 dozen eggs at 9 cents a dozen, and 3 chickens at 12 cents each; how much does the whole amount to?

12. If 4 calves are worth $6 each, and 8 sheep $4 each, how much are they all worth?

13. If 4 apple-trees bear 15 bushels each, and 7 pear-trees 5 bushels each, how much do they all bear?

14. 4 dozen eggs at 14 cents a dozen, and 3 pounds of cheese at 9 cents a pound, cost how much?

15. If there are 32 quarts in one bushel, and 8 quarts in one peck, how many quarts are there in 2 bushels and 3 pecks?

16. If it costs 25 cents a week to keep a cow, and 3 cents a week to keep a sheep, how much will it cost a week to keep 2 cows and 15 sheep?

17. Which cost the most, 4 pounds of cheese at 12 cents a pound, or 2 bushels of potatoes at 24 cents a bushel?

18. How many quarts in 3 bushels?

19. What cost a bushel of beans, at 3 cents a quart?

FIFTY-SECOND LESSON.

Division by 0 *and* 1.

1. How many times is nothing contained in nothing? *Ans.* Once.

2. How many times is 0 in 0? *Ans.* Once.

3. If an apple costs nothing, and you have nothing to pay, how many apples will your one nothing buy?

4. If an apple costs 1 cent, how many scholars, each paying nothing, can pay for it? Can 10? Can 99?

5. If your teacher should set a hat on the table, and each scholar should put nothing into it, how many nothings would it take to fill it?

6. 0 in 1 how many times? *Ans.* There is no limit or end to the number of times. Then, of course, there is none to the number of times that 0 is in 2, 3, 4, 5, 6, 7, 8 or 9. The number of times that 0 is contained in 1 or more, is represented by the figure 8 turned down thus: ∞, which is called the sign of infinity.

7. How many times is 1 in 1?

8. How many times is 1 in 2 times 1, or 2?

9. How many times is 1 in 3 times 1, or 3?

10. How many times is 1 in 4 times 1, or 4?

11. How many times is 1 in 5 times 1, or 5?

12. How many times is 1 in 6 times 1, or 6?

13. How many times is 1 in 7 times 1, or 7?

14. How many times is 1 in 8 times 1, or 8?

15. How many times is 1 in 9 times 1, or 9?

16. How many times is 1 in any number? *Ans.* Just as many times as there are units or ones in the number. 1 in 99, 99 times, &c.

17. How many times is any number in itself? *Ans.* Once.

18. How many times is 1 in 1? 2 in 2? 3 in 3? 4 in 4? 5 in 5? 6 in 6? 7 in 7? 8 in 8? 9 in 9? 99 in 99?

19. How many apples, at 1 cent each, can you buy for 5 cents?

20. How many sticks of candy, at 1 cent a stick, can you buy for 9 cents?

FIFTY-THIRD LESSON.

Division by 2.

Describe and recite this table.

				Outline Table.		Test Table.	
2 in 2	1 time;*	1 in 2	2 times.	2	2	2	16
2 in 4	2 times;	2 in 4	2 times.	2	4	2	2
2 in 6	3 times;	3 in 6	2 times.	2	6	2	12
2 in 8	4 times;	4 in 8	2 times.	2	8	2	10
2 in 10	5 times;	5 in 10	2 times.	2	10	2	6
2 in 12	6 times;	6 in 12	2 times.	2	12	2	18
2 in 14	7 times;	7 in 14	2 times.	2	14	2	8
2 in 16	8 times;	8 in 16	2 times.	2	16	2	14
2 in 18	9 times;	9 in 18	2 times.	2	18	2	4

Slate Exercises. 2)16, 10, 14, 8, 6, 4, 2, 12, 18.
8, 5, 7, 4, 3, 2, 1, 6, 9.

1. How many pears can you buy for 12 cents, at 2 cents each?

SOLUTION. *If you can buy* 1 *pear for* 2 *cents, you can buy as many for* 12 *cents as* 2 *cents are contained times in* 12 *cents, which are* 6 *times. Therefore, at* 2 *cents each, you can buy* 6 *pears for* 12 *cents.*

2. How many bushels of wheat, at $2 a bushel, can you buy for $10?

3. At 2 shillings a pound, how much butter can I buy for 14 shillings?

4. If 2 apples are worth one peach, how many peaches are 18 apples worth?

5. If a mason earn $2 in one day, in how many days will he earn $16?

6. If 2 bushels of corn are worth one of wheat, how many bushels of wheat will 10 bushels of corn buy?

7. If I walk 2 miles an hour, in how many hours will I walk 18 miles?

8. 4 times 4 are how many times 2?

---

* Once may be used instead of one time, and twice, instead of two times, if preferred.

FIFTY-FOURTH LESSON.

Division by 3.

Describe and recite this table.

				Outline Table.		Test Table.	
3 in 3	1 time;	1 in 3	3 times.	3	3	3	24
3 in 6	2 times;	2 in 6	3 times.	3	6	3	9
3 in 9	3 times;	3 in 9	3 times.	3	9	3	27
3 in 12	4 times;	4 in 12	3 times.	3	12	3	12
3 in 15	5 times;	5 in 15	3 times.	3	15	3	3
3 in 18	6 times;	6 in 18	3 times.	3	18	3	15
3 in 21	7 times;	7 in 21	3 times.	3	21	3	21
3 in 24	8 times;	8 in 24	3 times.	3	24	3	18
3 in 27	9 times;	9 in 27	3 times.	3	27	3	6

Slate Exercises. 3)21, 18, 9, 27, 3, 24, 6, 15, 12.
7, 6, 3, 9, 1, 8, 2, 5, 4.

1. How many glasses of liquor, at 3 cents a glass, will amount to 27 cents.

2. If a cigar costs 3 cents, and a boy smokes one every day, in how many days would he use up 21 cents?

3. If a tobacco-chewer uses every day a paper of tobacco, which costs 3 cents, in how many days would his tobacco cost 24 cents?

4. How many scholars in this class, think it is right to spend money for, or use liquor and tobacco?

5. How many think it is wrong?

6. Why is it right, or why is it wrong?

7. If a boy saves 3 cents a day, in how many days will he save 18 cents?

8. If a man can earn $3 in a week, in how many weeks can he earn $15?

9. If a horse eats a bushel of oats in 3 days, how many bushels will he eat in 12 days?

10. Three miles make one league. How many leagues in 9 miles?

11. If an army marches 27 miles in a day, how many leagues do they march?

12. How many leagues in 21 miles?

13. 9 times 2 are how many times 3?

FIFTY-FIFTH LESSON.

Division by 4, &c.

Describe and recite this table.				Outline Table.	Test Table.
4 in 4	1 time;	1 in 4	4 times.	4 4	4 16
4 in 8	2 times;	2 in 8	4 times.	4 8	4 4
4 in 12	3 times;	3 in 12	4 times.	4 12	4 20
4 in 16	4 times;	4 in 16	4 times.	4 16	4 12
4 in 20	5 times;	5 in 20	4 times.	4 20	4 8
4 in 24	6 times;	6 in 24	4 times.	4 24	4 32
4 in 28	7 times;	7 in 28	4 times.	4 28	4 24
4 in 32	8 times;	8 in 32	4 times.	4 32	4 36
4 in 36	9 times;	9 in 36	4 times.	4 36	4 28

Slate Exercises to be completed. 4)32, 4, 28, 8, 12, 16, 20, 36, 24.

1. 4 in 36 how many times, and why?

SOLUTION. 4 *in* 36 9 *times, because* 9 *times* 4 *are* 36.

2. 9 in 36 how many times, and why?

SOLUTION. 9 *in* 36 4 *times, because* 4 *times* 9 *are* 36.

3. By changing the order of the columns of the above table, and changing *in* to *are*, what table will you have?

4. What tables are the division tables nearest like?

5. What tables are the multiplication tables nearest like?

6. What tables are the subtraction tables nearest like?

7. What tables are the addition tables nearest like?

8. 6 times 6 are how many times 4?

9. 3 times 8 are how many times 4?

10. 6 times 2 are how many times 4?

11. 4 times 6 are how many times 3?

12. 9 and 8, less 1, are how many times 4?

13. 15 less 7 are how many times 4?

14. How many bushels of corn at 4 shillings a bushel, will pay for 3 bushels of wheat at 12 shillings a bushel?

15. How many oranges at 4 cents apiece, can you buy for 2 pounds of butter at 16 cents a pound?

16. If 2 cows are worth $18 each, how many sheep, at $4 each, will pay for them?

FIFTY-SIXTH LESSON.

Division by 5, &c.

Describe and recite this table.				Outline Table.	Test Table.
5 in 5	1 time;	1 in 5	5 times.	5 5	5 25
5 in 10	2 times;	2 in 10	5 times.	5 10	5 40
5 in 15	3 times;	3 in 15	5 times.	5 15	5 20
5 in 20	4 times;	4 in 20	5 times.	5 20	5 30
5 in 25	5 times;	5 in 25	5 times.	5 25	5 15
5 in 30	6 times;	6 in 30	5 times.	5 30	5 45
5 in 35	7 times;	7 in 35	5 times.	5 35	5 5
5 in 40	8 times;	8 in 40	5 times.	5 40	5 10
5 in 45	9 times;	9 in 45	5 times.	5 45	5 35

Slate Exercises to be completed. 5)40, 5, 45, 10, 35, 15, 20, 25, 30.

1. Who can carry this division table farther, and how far?
2. Who have seen a half-dime, and can tell how many cents it equals?
3. How many half-dimes in 40 cents?
4. 30 cents are how many half-dimes?
5. How many half-dimes equal 45 cents?
6. 25 cents are how many half-dimes?
7. Which is the most, 20 cents, or 4 half-dimes?
8. How many half-dimes in 35 cents?
9. 15 cents are how many half-dimes?
10. If 5 cows are worth one horse, how many horses are 40 cows worth?
11. If 5 pounds of sugar cost 30 cents, how much will 12 pounds cost?
12. If 2 coats cost $10, what will 6 cost?
13. If a man receives 9 dimes a day, and his daily expenses are 4 dimes, in how many days can he save 30 dimes?
14. If a man receives $10 a month, and a woman $5 a month, in how many months will the man receive $40 more than the woman?
15. 4 times 10 are how many times 5?

FIFTY-SEVENTH LESSON.

Division by 6, &c.

Describe and recite this table.				Outline Table.		Test Table.	
6 in 6	1 time;	1 in 6	6 times.	6	6	6	48
6 in 12	2 times;	2 in 12	6 times.	6	12	6	36
6 in 18	3 times;	3 in 18	6 times.	6	18	6	18
6 in 24	4 times;	4 in 24	6 times.	6	24	6	30
6 in 30	5 times;	5 in 30	6 times.	6	30	6	6
6 in 36	6 times;	6 in 36	6 times.	6	36	6	12
6 in 42	7 times;	7 in 42	6 times.	6	42	6	24
6 in 48	8 times;	8 in 48	6 times.	6	48	6	54
6 in 54	9 times;	9 in 54	6 times.	6	54	6	42

Slate Exercises to be completed. 6)54, 12, 48, 18, 42, 24, 30, 36, 6.

1. Recite the numbers to be divided in this table, from 6 to 54 and back.
2. How many is half a dozen?
3. How many half-dozen in 30?
4. How many half-dozen in 48?
5. How many half-dozen in 54?
6. 36 are how many half-dozen?
7. How many working-days in one week?
8. How many weeks do 18 working-days require?
9. How many New England shillings make a dollar?
10. How many dollars will 24 N. E. shillings make?
11. How many dollars will 42 N. E. shillings make?
12. If a girl earns 6 shillings a week, in how many weeks will she earn 48 shillings?
13. How many tons of coal can you buy for $30, at $6 a ton?
14. How many days'-work can 3 men do in 8 days?
15. In how many days can 6 men do the same work?
16. How many men in 6 days, can do the same amount of work as 3 men in 12 days?
17. If 2 teams can plow a field in 6 days, in how many days can 4 teams plow the same field?

FIFTY-EIGHTH LESSON.

● *Division by 7, &c.*

Describe and recite this table.				Outline Table.	Test Table.
7 in 7	1 time;	1 in 7	7 times.	7 7	7 49
7 in 14	2 times;	2 in 14	7 times.	7 14	7 49
7 in 21	3 times;	3 in 21	7 times.	7 21	7 35
7 in 28	4 times;	4 in 28	7 times.	7 28	7 7
7 in 35	5 times;	5 in 35	7 times.	7 35	7 28
7 in 42	6 times;	6 in 42	7 times.	7 42	7 42
7 in 49	7 times;	7 in 49	7 times.	7 49	7 63
7 in 56	8 times;	8 in 56	7 times.	7 56	7 21
7 in 63	9 times;	9 in 63	7 times.	7 63	7 56

Slate Exercises to be completed. 7)63, 7, 56, 14, 49, 21, 42, 35, 28.

1. How many days in one week?
2. How many weeks in 56 days?
3. How many weeks in 35 days?
4. How many weeks in 49 days?
5. How many weeks in 63 days?
6. If the interest on one dollar for a year is 7 cents, how many dollars will produce 21 cents interest in a year?
7. How many dollars will produce 28 cents?
8. How many dollars will produce 14 cents?
9. How many dollars will produce 49 cents?
10. How many dollars will produce 35 cents?
11. 4 times 9, and 6 added, are how many times 7?
12. 4 times 14 are how many times 7?
13. 3 times 21 are how many times 7?
14. 4 times 6, and 4 added, are how many times 7?
15. If 7 tons of hay cost $35, how much will 9 tons cost?
16. If 3 men cradle 15 acres of grain in one day, how much can 8 men cradle in the same time?
17. If a man earns14 dimes in 2 days, how much will he earn in a week?
18. If 5 cords of wood cost $20, what will 20 cords cost?

FIFTY-NINTH LESSON.

Division by 8, &c.

Describe and recite this table.	Outline Table.	Test Table.
8 in 8 1 time; 1 in 8 8 times.	8 8	8 64
8 in 16 2 times; 2 in 16 8 times.	8 16	8 32
8 in 24 3 times; 3 in 24 8 times.	8 24	8 48
8 in 32 4 times; 4 in 32 8 times.	8 32	8 72
8 in 40 5 times; 5 in 40 8 times.	8 40	8 8
8 in 48 6 times; 6 in 48 8 times.	8 48	8 56
8 in 56 7 times; 7 in 56 8 times.	8 56	8 16
8 in 64 8 times; 8 in 64 8 times.	8 64	8 24
8 in 72 9 times; 9 in 72 8 times.	8 72	8 40

Slate Exercises to be completed. 8)72, 8, 64, 16, 56, 24, 48, 32, 40.

1. If a boy earns 8 cents in a day, in how many days will he earn 56 cents?

2. If a boy every day earns 9 cents, and saves all but one, in how many days will he save 72 cents?

3. At 8 cents a yard, how much sheeting can be bought for 64 cents?

4. If the rent of one acre of land, for one year, is $8, how many acres can be rented for $32?

5. If a man receives $8 a month, in how many months will he receive $40?

6. If a cow gives 8 quarts of milk a day, in how many days will she give 56 quarts?

7. If a scholar learns 5 lessons in the forenoon, and 3 in the afternoon, in how many days will he learn 48 lessons?

8. 4 times 6 are how many times 8?

9. 2 times 32 are how many times 8?

10. 4 times 12 are how many times 8?

11. 3 times 24 are how many times 8?

12. 4 times 14 are how many times 8?

13. 13 less 5 are how many times 2?

14. 16 less 8 are how many times 4?

15. If 8 shillings make $1, how many dollars in 72 shillings? in 16? in 40?

SIXTIETH LESSON.

Division by 9, &c.

Describe and recite this table.

				Outline Table.	Test Table.
9 in 9	1 time;	1 in 9	9 times.	9 9	9 54
9 in 18	2 times;	2 in 18	9 times.	9 18	9 36
9 in 27	3 times;	3 in 27	9 times.	9 27	9 45
9 in 36	4 times;	4 in 36	9 times.	9 36	9 9
9 in 45	5 times;	5 in 45	9 times.	9 45	9 63
9 in 54	6 times;	6 in 54	9 times.	9 54	9 18
9 in 63	7 times;	7 in 63	9 times.	9 63	9 81
9 in 72	8 times;	8 in 72	9 times.	9 72	9 27
9 in 81	9 times;	9 in 81	9 times.	9 81	9 72

Slate Exercises to be completed. 9)81, 9, 72, 18, 36, 63, 27, 45, 54.

1. If a man works 9 hours in a day, in how many days will he work 81 hours?
2. When flour is $9 a barrel, how many barrels can be bought for $45?
3. If a horse can travel 9 miles in an hour, in how many hours can he travel 36 miles?
4. If a steamboat can go 9 miles in an hour, in how many hours can it go 72 miles?
5. If these scholars average 9 hours of sleep each day, in how many days will they sleep 63 hours?
6. How many times 9 are 3 times 27?
7. 6 times 6 are how many times 9?
8. 3 times 15 are how many times 9?
9. 3 times 24 are how many times 9?
10. 7 times 7, and 5 added, are how many times 9?
11. 6 times 7, and 3 added, are how many times 9?
12. 3 times 6 are how many times 9?
13. 7 and 7, less 2, are how many times 2?
14. 7 and 6, less 1, are how many times 6?
15. 5 and 6, less 1, are how many times 5?
16. 17 less 8 are how many times 3?
17. 23 less 5 are how many times 3?

SIXTY-FIRST LESSON.

General Review Table in Division.

5 35	9 81	3 6	6 18	7 42	2 10	6 36	1 2	8 8
2 18	4 36	9 9	7 49	1 5	4 16	7 28	8 64	1 1
8 72	2 2	6 12	9 63	5 25	3 15	8 16	7 21	3 27
9 27	7 63	5 40	3 9	9 18	8 56	2 12	6 42	4 4
7 7	5 45	2 4	1 6	8 24	9 54	3 21	4 8	7 14
4 20	6 6	7 56	8 48	2 8	1 4	9 45	2 14	6 48
3 18	3 3	8 32	4 28	3 12	6 30	5 15	9 36	5 5
1 7	8 40	1 8	5 30	4 24	7 35	4 12	3 24	2 16
6 54	1 9	4 32	2 6	6 24	5 20	1 3	5 10	9 72

0 in 0 once. 0 in 1, 2, 3, 4, 5, 6, 7, 8, 9, &c., an infinite number of times, represented by ∞.

The scholar who can read this table correctly in the least time, is the most thoroughly master of division.- In how many minutes can you read correctly the General Review tables in addition, subtraction, multiplication and division?

Form tables of combinations from your division tables on your slate, by writing the number divided above, and the number to divide by below, a separating line. No combinations make 0; 10 make 1; 9 make each of the other single figures.

$$\frac{0,\ 1,\ 2,\ 3,\ 4,\ 5,\ 6,\ 7,\ 8,\ 9.}{0,\ 1,\ 2,\ 3,\ 4,\ 5,\ 6,\ 7,\ 8,\ 9.} \qquad \frac{2,\ 4,\ 6,\ 8,\ 10,\ 12,\ 14,\ 16,\ 18.}{1,\ 2,\ 3,\ 4,\ 5,\ 6,\ 7,\ 8,\ 9,\ \&c.}$$

Take any two single figures, and add, subtract, multiply and divide both ways, as in the tables.

4 5

4 and 5 are 9; 5 and 4 are 9.
4 from 9 leaves 5; 5 from 9 leaves 4.
4 times 5 are 20; 5 times 4 are 20.
4 in 20 5 times; 5 in 20 4 times.

SIXTY-SECOND LESSON.

Division of tens and units by units, &c.

1. 4 is contained in 84 how many times?

SOLUTION. 4 *units in* 8 *tens* 2 *tens times.* 4 *units in* 4 *units* 1 *unit time.* 2 *tens and* 1 *unit are* 21. *Therefore* 4 *is contained in* 84 21 *times.*

2. 3 in 33 how many times? in 36? in 39?
3. 3 in 66 how many times? in 63? in 69?
4. 3 in 93 how many times? in 96? in 99?
5. Tell at sight the answers to the following questions.
6. 2 in 22, 24, 26, 28, 42, 44, 46, 48, 62, 64, 66, 68, 82, 84, 86, 88; 4 in 44, 48, 84, 88; 5 in 55; 7 in 77; 8 in 88; 9 in 99; how many times?
7. 4 in 96 how many times?

SOLUTION. 4 *units in* 9 *tens* 2 *tens times, and* 1 *ten over.* 1 *ten and* 6 *units are* 16 *units.* 4 *units in* 16 *units,* 4 *units times.* 2 *tens and* 4 *units are* 24. *Therefore &c.*

ANOTHER SOLUTION. 96 *is* 8 *tens and* 16 *units.* 4 *in* 8 *tens* 2 *tens times.* 4 *in* 16 4 *times.* 2 *tens and* 4 *are* 24. *Therefore &c.*

8. 6 in 96 how many times? [6 tens and 36 units.]
9. 5 in 95 how many times? [5 tens and 45 units.]
10. Divide 72 by 2; by 3; by 4: 88 by 2; by 4.
11. In dividing tens, or tens and units, by tens, we divide only the tens by the tens as here indicated.
12. 1̸0 in 1̸0, 2̸0, 3̸0, 4̸0, 5̸0, 6̸0, 7̸0, 8̸0, 9̸0, 1, 2, 3, 4, 5, 6, 7, 8, 9 times.
13. 2̸0 in 2̸0, 4̸0, 6̸0, 8̸0, 1, 2, 3, 4 times.
14. If we put 1, 2, 3, 4, 5, 6, 7, 8 or 9 in the place of the 0 of each number divided, we have the same answer with 1, 2, 3, 4, 5, 6, 7, 8 or 9 remainder; thus 1̸0 in 1̸1 once, and 1 remainder; 1̸0 in 1̸2 once, and 2 remainder.
15. Supply the figures mentally in the place of 0, and tell the answers to 50 examples.
16. 2̸0 in 9̸6, 4 times and 16 remainder.
17. Write on your slates 50 such examples, and work them in the same way.

SIXTY-THIRD LESSON.

Miscellaneous Questions.

1. Five men bought a horse for $90; A paid $5, B paid twice as much as A, C twice as much as B, D twice as much as C, and E the rest; how much did each pay?

2. In cities, day-laborers commonly work 5 hours each half-day. At that rate, how many hours-work will a man have done at the end of each half-day?

3. If a peach costs 6 cents, and a pine-apple 3 times as much, and a lemon twice as much as the pine-apple, lacking 30 cents, and a cocoa-nut 4 times as much as the peach and lemon, lacking 40 cents, how much more or less does each cost than each of the others, and what do they all cost?

4. If Harlow and Thomas start from your school-house and travel in the same direction, Harlow going 2 miles an hour, and Thomas 3, how far will they be from their starting-place and from each other in 1 hour? in 4 hours? in 6? in 8? in 5? in 7?

5. If they go in opposite directions, how far will they be from their starting-place and from each other at the same time?

6. If 5 sheep and $9 are worth a cow at $19, how much is each sheep worth?

7. A lady bought a pair of shoes at $2, a bonnet at $7, 12 yards of silk at $2 a yard, and trimmings for $3; she handed the merchant eight $5 bills; how much change should she receive?

8. A man bought a horse for $65; he paid $3 a week for his keeping. At the end of 5 weeks the horse had earned $20, and was sold at 70; did the man gain or lose, and how much?

9. If B lives 10 miles east of A, C 15 miles east of B, D 45 miles east of A, and E 50 miles east of C, how far does each one live east or west of each of the others?

SIXTY-FOURTH LESSON.

Halves and Fractional Forms.

1. Explain what is meant by 1 half.

When any thing or number is divided into 2 equal parts, each of these 2 equal parts is called 1 half of the thing or number.

2. What are the two parts called, and to what are they equal?

3. If one part is larger than the other, what is it called? *Ans.* A piece. It cannot be a half or any other fraction, unless the thing or number is divided into *equal* parts.

4. If 2 apples are each divided into 2 equal parts, what is each part called?

5. What are the 4 parts called, and to what are they all equal?

6. How may any number of halves be written with figures? *Ans.* With 2 below, and the number of halves above, a separating line. Thus: $\frac{1}{2}$, $\frac{2}{2}$, $\frac{3}{2}$, $\frac{4}{2}$, $\frac{5}{2}$, $\frac{6}{2}$, $\frac{7}{2}$, $\frac{8}{2}$, $\frac{9}{2}$, &c.

7. Read these: $\frac{1}{\text{cow}}$, $\frac{1}{2}$, $\frac{2}{\text{cows}}$, $\frac{2}{2}$, $\frac{3}{\text{cows}}$, $\frac{3}{2}$, $\frac{4}{\text{hens}}$, $\frac{4}{2}$, $\frac{5}{\text{trees.}}$ $\frac{5}{2}$.

The word or figure below the line merely tells the kind, or gives the name, while the figure above shows how many of that kind or name are used.

8. How many halves in 2? 3? 4? 5? 6? 7? 8? 9?

SOLUTION. *In* 1 *are* $\frac{2}{2}$. 2 *is* 2 *times* 1, *and therefore twice* $\frac{2}{2}$ *or* $\frac{4}{2}$. 3 *is* 3 *times* 1, *and therefore* 3 *times* $\frac{2}{2}$ *or* $\frac{6}{2}$.

9. How many whole ones in $\frac{4}{2}$? $\frac{2}{2}$? $\frac{6}{2}$? $\frac{10}{2}$? $\frac{8}{2}$? $\frac{12}{2}$?

SOLUTION. *Since* $\frac{2}{2}$ *make* 1, *there will be as many whole ones in* $\frac{4}{2}$ *as* 2 *is contained times in* 4, *which is* 2. *Therefore* $\frac{4}{2}$ *are* 2 *whole ones.*

10. $\frac{1}{2}$ of 8 is how many? $\frac{2}{2}$ of 8? $\frac{4}{2}$ of 8?

11. $\frac{3}{2}$ of 12 are how many times 2?

12. $\frac{4}{2}$ of 6 are how many times 2?

13. By what do you divide halves to make whole ones?

14. By what do you multiply ones to make halves?

SIXTY-FIFTH LESSON.

Thirds, &c.

1. Explain what is meant by the terms one-third, two-thirds, &c.

When any thing or number is divided into 3 equal parts, one of these 3 equal parts is called 1 third of the thing or number; 2 of them, 2 thirds, &c.

2. How may any number of thirds be written with figures? *Ans.* With 3 below, and the number of thirds above, a separating line. Read these: $\frac{1}{3}$, $\frac{2}{3}$, $\frac{3}{3}$, $\frac{9}{3}$, $\frac{4}{3}$, $\frac{7}{3}$, $\frac{5}{3}$.

3. How many thirds in 2? 3? 4? 5? 6? 7? 8? 9?

Solution. *In* 1 *are* $\frac{3}{3}$. *Since* 2 *is twice* 1, *in* 2 *there will be twice* $\frac{3}{3}$ *or* $\frac{6}{3}$. *Therefore in* 2 *there are* $\frac{6}{3}$.

4. How many whole ones in $\frac{6}{3}$? $\frac{9}{3}$? $\frac{12}{3}$? $\frac{15}{3}$ $\frac{18}{3}$? $\frac{21}{3}$?

Solution. *Since* $\frac{3}{3}$ *make* 1, *there will be as many whole ones in* $\frac{6}{3}$ *as* 3 *is contained times in* 6, *which is* 2. *Therefore* $\frac{6}{3}$ *are* 2 *whole ones.*

5. How many whole ones in $\frac{7}{3}$, and what fraction remains?

6. How many whole ones in $\frac{5}{2}$, and what fraction remains?

7. $\frac{2}{3}$ of 15 are how many times 2?

Solution. $\frac{1}{3}$ *of* 15 *is* 5. $\frac{2}{3}$ *of* 15 *are twice* 5, *or* 10, *which is* 5 *times* 2. *Therefore* $\frac{2}{3}$ *of* 15 *are* 5 *times* 2.

8. $\frac{2}{3}$ of 12 are how many times 4?
9. $\frac{2}{3}$ of 9 are how many times 2?
10. $\frac{5}{3}$ of 21 are how many times 5?
11. $\frac{2}{3}$ of 27 are how many times 6?
12. $\frac{4}{3}$ of 6 are how many times 2?
13. $\frac{6}{3}$ of 24 are how many times 6?
14. $\frac{7}{3}$ of 15 are how many times 7?
15. $\frac{9}{3}$ of 6 are how many times 3?

16. By what do you divide any number of thirds to change them to whole ones?

17. By what do you multiply whole ones to change them to thirds?

18. What is a fraction? *Ans.* It is one or more of the equal parts of a thing or number.

SIXTY-SIXTH LESSON.

Fourths, Mixed Numbers, &c.

1. Explain what is meant by one or more fourths.

When any thing or number is divided into 4 equal parts, 1 of these 4 equal parts is called 1 fourth of the thing or number, 2 of them 2 fourths, &c.

2. How may any number of fourths be written with figures? *Ans.* With 4 below, and the number of fourths above, a separating line.

Read these: $\frac{4}{4}$, $\frac{8}{4}$, $\frac{12}{4}$, $\frac{14}{4}$, $\frac{16}{4}$, $\frac{20}{4}$, $\frac{24}{4}$, $\frac{28}{4}$.

3. How many fourths in 2? 3? 4? 5? 6? 7?

4. How many whole ones in $\frac{4}{4}$? $\frac{12}{4}$? $\frac{36}{4}$? $\frac{24}{4}$? $\frac{16}{4}$?

5. How may any whole number and any fraction be written together with figures? *Ans.* By writing the fraction at the right of the whole number with small figures; thus, $3\frac{1}{2}$, $3\frac{2}{3}$, $4\frac{3}{4}$.

6. What are whole numbers and fractions thus written together called? *Ans.* Mixed numbers; because whole numbers and fractions are mixed together, or at least stand side by side.

7. How are mixed numbers read? *Ans.* Just as each part was read before, with only the word *and* between the whole number and the fraction.

8. Read $1\frac{1}{2}$, $2\frac{2}{3}$, $3\frac{3}{4}$, $4\frac{1}{2}$, $5\frac{2}{3}$, $6\frac{2}{4}$, $7\frac{1}{3}$, $8\frac{1}{4}$.

9. $3\frac{3}{4}$ are how many fourths?

SOLUTION. *In* 1 *are* $\frac{4}{4}$. *Since* 3 *is* 3 *times* 1, 3 *is* 3 *times* $\frac{4}{4}$ *or* $\frac{12}{4}$. $\frac{12}{4}$ *and* $\frac{3}{4}$ *are* $\frac{15}{4}$. *Therefore* $3\frac{3}{4}$ *are* $\frac{15}{4}$.

10. $6\frac{2}{4}$ are how many fourths?
11. $8\frac{1}{4}$ are how many fourths?
12. $9\frac{3}{4}$ are how many fourths?
13. $7\frac{1}{4}$ are how many fourths?
14. $6\frac{2}{4}$ are how many fourths?
15. $2\frac{2}{4}$ are how many fourths?
16. $4\frac{1}{4}$ are how many fourths?
17. $8\frac{3}{4}$ are how many fourths?
18. $5\frac{1}{4}$ are how many fourths?
19. $3\frac{3}{4}$ are how many fourths?

SIXTY-SEVENTH LESSON.

Fifths, &c.

1. Explain what is meant by one or more fifths. When any thing or number is divided into 5 equal parts, 1 of these 5 equal parts is called 1 fifth of the thing or number, 2 of them 2 fifths, &c.

2. How may any number of fifths be expressed with figures? *Ans.* With 5 below, and the number of fifths above, a separating line. Thus, $\frac{1}{5}$, $\frac{2}{5}$, $\frac{3}{5}$, $\frac{4}{5}$, &c.

3. How many fifths in 2? 3? 4? 5? 6? 7? 8? 9?

4. How many whole ones in $\frac{10}{5}$? $\frac{15}{5}$? $\frac{20}{5}$? $\frac{25}{5}$? $\frac{40}{5}$?

5. How many fifths in $1\frac{2}{5}$? $2\frac{3}{5}$? $4\frac{4}{5}$? $6\frac{2}{5}$? $7\frac{1}{5}$? $8\frac{3}{5}$?

6. What mixed number equals $\frac{8}{5}$? $\frac{14}{5}$? $\frac{23}{5}$? $\frac{31}{5}$? $\frac{37}{5}$?

7. What will $\frac{3}{5}$ of a pound of coffee cost, if 1 pound costs 15 cents?

SOLUTION. *If* $\frac{5}{5}$ *or* 1 *pound costs* 15 *cents,* $\frac{1}{5}$ *will cost* $\frac{1}{5}$ *of* 15 *cents, or* 3 *cents, and* $\frac{3}{5}$ *will cost* 3 *times* 3 *cents, or* 9 *cents. Therefore &c.*

8. What will $\frac{4}{5}$ of a bushel of wheat cost, at 15 dimes a bushel?

9. At 10 shillings a day, how much will a man earn in $\frac{3}{5}$ of a day?

10. If $\frac{1}{5}$ of a yard of calico is worth 2 cents, how much is a yard worth?

11. If $\frac{1}{5}$ of an acre of land is worth $7, how much is an acre worth?

12. $\frac{4}{5}$ of 25 are how many times 2?
13. $\frac{3}{5}$ of 40 are how many times 3?
14. $\frac{7}{5}$ of 30 are how many times 6?
15. $\frac{3}{5}$ of 45 are how many times 3?
16. $\frac{4}{5}$ of 20 are how many times 2?
17. $\frac{9}{5}$ of 10 are how many times 6?
18. $\frac{2}{5}$ of 35 are how many times 7?
19. $\frac{6}{5}$ of 10 are how many times 4?
20. $\frac{1}{5}$ of 15, and $\frac{1}{2}$ of 10, are how many times 4?
21. $\frac{1}{3}$ of 12, and $\frac{1}{4}$ of 20, are how many times 3?
22. $\frac{3}{2}$ of 8, and $\frac{1}{5}$ of 15, are how many times 3?

SIXTY-EIGHTH LESSON.

Sixths and Addition of Fractions.

1. Explain what is meant by one or more sixths. When any thing or number is divided into 6 equal parts, 1 of these 6 equal parts is called 1 sixth of the thing or number, 2 of them 2 sixths, &c.

2. How may any number of sixths be expressed with figures? *Ans.* With 6 below, and the number of sixths above, a separating line. Thus, $\frac{1}{6}$, $\frac{4}{6}$, $\frac{10}{6}$, $\frac{5}{6}$, &c.

3. How many sixths in 2? 3? 4? 5? 6? 7? 8? 9?
4. How many whole ones in $\frac{12}{6}$? $\frac{18}{6}$? $\frac{24}{6}$? $\frac{30}{6}$? $\frac{36}{6}$?
5. How many sixths in $1\frac{1}{6}$? $2\frac{2}{6}$? $3\frac{3}{6}$? $4\frac{4}{6}$? $5\frac{5}{6}$? $6\frac{3}{6}$?
6. What mixed number equals $\frac{8}{6}$? $\frac{15}{6}$? $\frac{20}{6}$? $\frac{34}{6}$? $\frac{38}{6}$?
7. How many cows are $\frac{1}{\text{cow,}}$ $\frac{2}{\text{cows,}}$ and $\frac{3}{\text{cows,}}$?
8. How many sixths are $\frac{1}{6}$, $\frac{2}{6}$ and $\frac{3}{6}$?
9. In adding fractions, do you add the upper or lower figure?
10. What is the use of the lower figure? *Ans.* It tells the name and size of the parts.
11. How many sixths are $\frac{1}{6}$ and $\frac{4}{6}$?
12. How many sixths are $\frac{3}{6}$ and $\frac{7}{6}$?
13. How many sixths are $\frac{9}{6}$ and $\frac{8}{6}$?
14. How many sixths are $\frac{7}{6}$ and $\frac{5}{6}$?
15. How many sixths are $\frac{5}{6}$ and $\frac{6}{6}$?
16. How many sixths are $\frac{1}{6}$, $\frac{2}{6}$ and $\frac{3}{6}$?
17. How many sixths are $\frac{4}{6}$, $\frac{5}{6}$ and $\frac{7}{6}$?
18. Are such fractions more difficult to add than whole numbers?
19. How many halves are $\frac{1}{2}$, $\frac{2}{2}$, $\frac{3}{2}$ and $\frac{4}{2}$?
20. How many thirds are $\frac{1}{3}$, $\frac{2}{3}$, $\frac{3}{3}$ and $\frac{4}{3}$?
21. How many fourths are $\frac{1}{4}$, $\frac{2}{4}$, $\frac{3}{4}$ and $\frac{4}{4}$?
22. How many fifths are $\frac{1}{5}$, $\frac{2}{5}$, $\frac{3}{5}$ and $\frac{4}{5}$?
23. $\frac{9}{6}$ of 12 are how many times 3?
24. $\frac{4}{6}$ of 36 are how many times 8?
25. $\frac{3}{6}$ of 42 are how many times 7?
26. $\frac{7}{6}$ of 54 are how many times 9?
27. $\frac{9}{2}$ of 8 are how many times 6?

SIXTY-NINTH LESSON.

Sevenths and Subtraction of Fractions.

1. Explain what is meant by 1 or more sevenths. When any thing or number is divided into 7 equal parts, 1 of these 7 equal parts is called 1 seventh of the thing or number, 2 of them 2 sevenths, &c.

2. How may any number of sevenths be expressed with figures? *Ans.* With 7 below, and the number of sevenths above, a separating line. Thus, $\frac{4}{7}$, $\frac{3}{7}$, $\frac{6}{7}$, $\frac{8}{7}$, &c.

3. How many sevenths in 2? 3? 4? 5? 6? 7? 8? 9?

4. How many whole ones in $\frac{14}{7}$? $\frac{21}{7}$? $\frac{35}{7}$? $\frac{28}{7}$? $\frac{63}{7}$?

5. How many sevenths in $1\frac{1}{7}$? $2\frac{2}{7}$? $3\frac{3}{7}$? $4\frac{4}{7}$? $5\frac{5}{7}$?

6. What mixed number equals $\frac{9}{7}$? $\frac{17}{7}$? $\frac{26}{7}$? $\frac{31}{7}$? $\frac{40}{7}$?

7. $\frac{1}{\text{cow}}$ from $\frac{3}{\text{cows,}}$ leaves how many cows?

8. $\frac{1}{7}$ from $\frac{3}{7}$ leaves how many sevenths?

9. $\frac{8}{7}$ from $\frac{17}{7}$ leaves how many sevenths?

10. $\frac{9}{7}$ from $\frac{16}{7}$ leaves how many sevenths?

11. Are such fractions more difficult to subtract than whole numbers?

12. Do you subtract the upper or lower number?

13. What is the use of the lower number?

14. $\frac{5}{2}$ less $\frac{2}{2}$ are how many halves?

15. $\frac{6}{3}$ less $\frac{1}{3}$ are how many thirds?

16. $\frac{18}{4}$ less $\frac{9}{4}$ are how many fourths?

17. $\frac{16}{5}$ less $\frac{7}{5}$ are how many fifths?

18. $\frac{11}{6}$ less $\frac{4}{6}$ are how many sixths?

19. The Sabbath is what fraction of the week?

20. The working-days are what fraction of the week? Why?

21. $\frac{1}{7}$ of 63 are how many times 3?

22. $\frac{4}{7}$ of 35 are how many times 5?

23. $\frac{5}{7}$ of 14 are how many times 2?

24. $\frac{2}{7}$ of 21 are how many times $\frac{1}{2}$ of 4?

25. $\frac{3}{7}$ of 28 are how many times $\frac{1}{6}$ of 36?

26. $\frac{8}{7}$ of 14 are how many times $\frac{1}{5}$ of 10?

27. $\frac{6}{7}$ of a week are how many times 2 days?

28. [illegible] of 9, less $\frac{1}{2}$ of 8, is what number?

SEVENTIETH LESSON.

Eighths and Multiplication of Fractions.

1. Explain what is meant by one or more eighths. When any thing or number is divided into 8 equal parts, 1 of these 8 equal parts is called 1 eighth of the thing or number, 2 of them 2 eighths, &c.

2. How may any number of eighths be expressed with figures? *Ans.* With 8 below, and the number of eighths above, a separating line. Thus, $\frac{4}{8}$, $\frac{3}{8}$, $\frac{5}{8}$, $\frac{9}{8}$, &c.

3. How many eighths in 2? 3? 4? 5? 6? 7? 8?

4. How many whole ones in $\frac{16}{8}$? $\frac{40}{8}$? $\frac{32}{8}$? $\frac{24}{8}$? $\frac{64}{8}$?

5. How many eighths in $1\frac{1}{8}$? $2\frac{2}{8}$? $3\frac{3}{8}$? $4\frac{4}{8}$? $5\frac{5}{8}$? $6\frac{6}{8}$?

6. What mixed number equals $\frac{10}{8}$? $\frac{20}{8}$? $\frac{30}{8}$? $\frac{40}{8}$? $\frac{50}{8}$?

7. 2 times $\frac{2}{\text{cows}}$ are how many cows?

8. 2 times $\frac{3}{8}$ are how many eighths?

9. 9 times $\frac{7}{8}$ are how many eighths?

10. 7 times $\frac{5}{8}$ are how many eighths?

11. In multiplying fractions, do you multiply the upper or lower number?

12. What is the use of the lower number?

13. 8 times $\frac{1}{2}$ are how many whole ones?

14. 9 times $\frac{1}{3}$ are how many ones?

15. 8 times $\frac{3}{4}$ are how many ones?

16. 5 times $\frac{2}{5}$ are how many ones?

17. 9 times $\frac{4}{6}$ are how many ones?

18. 7 times $\frac{3}{7}$ are how many ones?

19. $\frac{3}{8}$ of 16 are how many halves of 4?

20. $\frac{5}{8}$ of 40 are how many fourths of 20?

21. $\frac{9}{8}$ of 32 are how many thirds of 12?

22. $\frac{6}{8}$ of 64 are how many halves of 16?

23. $\frac{4}{8}$ of 24 are how many fourths of 12?

24. 9 times $\frac{2}{8}$, less $\frac{2}{8}$, are how many ones?

25. 9 times $\frac{5}{8}$, less $\frac{5}{8}$, are how many ones?

26. 7 times $\frac{4}{8}$, less $\frac{4}{8}$, are how many ones?

27. 6 times $\frac{6}{8}$, and $\frac{4}{8}$ added, are how many ones?

28. 5 times $\frac{3}{8}$, and $\frac{1}{8}$ added, are how many ones?

29. 8 times $\frac{3}{8}$, and $\frac{8}{8}$ added, are how many ones?

SEVENTY-FIRST LESSON.

Ninths and Division of Fractions.

1. Explain what is meant by one or more ninths. When any thing or number is divided into 9 equal parts, 1 of these 9 equal parts is called 1 ninth of the thing or number, 2 of them 2 ninths, &c.

2. How may any number of ninths be expressed with figures? *Ans.* With 9 below, and the number of ninths above, a separating line. Thus, $\frac{2}{9}$, $\frac{4}{9}$, $\frac{5}{9}$, $\frac{10}{9}$, $\frac{3}{9}$, $\frac{6}{9}$, &c.

3. How many ninths in 2? 3? 4? 5? 6? 7? 8? 9?

4. How many whole ones in $\frac{27}{9}$? $\frac{36}{9}$? $\frac{18}{9}$? $\frac{45}{9}$? $\frac{81}{9}$?

5. How many ninths in $1\frac{1}{9}$? $2\frac{2}{9}$? $3\frac{3}{9}$? $4\frac{4}{9}$? $5\frac{5}{9}$? $6\frac{6}{9}$?

6. What mixed number equals $\frac{11}{9}$? $\frac{20}{9}$? $\frac{30}{9}$? $\frac{40}{9}$? $\frac{50}{9}$?

7. If $\frac{4}{\text{hens}}$ are equally divided between 2 boys, how many hens will each boy have?

8. If $\frac{4}{9}$ of an apple are equally divided between 2 boys, how many ninths will each have?

9. If $\frac{8}{9}$ of an apple are divided in the same way, how many ninths will each have? If $\frac{12}{9}$? If $\frac{14}{9}$?

10. What is $\frac{1}{8}$ of $\frac{72}{9}$, or $\frac{72}{9}$ divided by 8?

11. What part or fraction of any thing or number do you get by dividing by 2? 3? 4? 5? 6? 7? 8? 9?

12. What is $\frac{1}{9}$ of $\frac{63}{8}$? $\frac{1}{9}$ of $\frac{18}{2}$? $\frac{1}{9}$ of $\frac{36}{3}$? $\frac{1}{9}$ of $\frac{45}{7}$?

13. What is $\frac{1}{4}$ of $\frac{12}{6}$? $\frac{1}{4}$ of $\frac{20}{3}$? $\frac{1}{8}$ of $\frac{40}{5}$? $\frac{1}{8}$ of $\frac{15}{4}$?

14. In dividing fractions, do you divide the upper or the lower number?

15. What do you divide a number by to get its half? third? fourth? fifth? sixth? seventh? eighth? ninth?

16. Explain what is meant by one or more tenths, elevenths, twenty-fifths, fortieths, ninety-ninths.

17. Can you now read, write, add, subtract, multiply and divide fractions?

18. Fractions are sometimes *printed* in this form: 1–2, 2–3, 3–4, 4–5, instead of $\frac{1}{2}$, $\frac{2}{3}$, $\frac{3}{4}$, $\frac{4}{5}$.

19. Fractions are generally *written* in this form: ${}^{1}\!/_{2}$, ${}^{1}\!/_{3}$, ${}^{2}\!/_{3}$, ${}^{1}\!/_{4}$, ${}^{3}\!/_{4}$, ${}^{1}\!/_{8}$, ${}^{3}\!/_{8}$, ${}^{5}\!/_{8}$, ${}^{7}\!/_{8}$.

20. Write in the 3 ways ${}^{1}\!/_{2}$, ${}^{1}\!/_{3}$, ${}^{2}\!/_{3}$, ${}^{1}\!/_{4}$, ${}^{3}\!/_{4}$, ${}^{3}\!/_{8}$, ${}^{3}\!/_{8}$, 5

SEVENTY-SECOND LESSON.

Practical Questions in Fractions.

1. Grandfather is 72 years old, and father is $\frac{5}{8}$ as old; how old is father?

2. $\frac{5}{9}$ of father's age divided by 5, is $\frac{1}{2}$ of my age. How old am I?

3. Mother is 35 years old, and grandmother $\frac{9}{5}$ as old. How old is she?

4. Cousin Jane is 12 years old, and $\frac{7}{2}$ of her age is the age of uncle Edwin. How old is uncle Edwin?

5. $\frac{2}{7}$ of uncle Edwin's age is twice the age of his son William. How old is cousin William?

6. $\frac{4}{7}$ of the days of the week is twice the number of dollars I pay a week for my board. How much do I pay for my board?

7. If a yoke of cattle is worth $64, and 6 calves are worth $\frac{3}{8}$ as much, how much is one calf worth?

8. $\frac{3}{8}$ of the number of quarts in a bushel of corn, is twice the number of shillings it cost. What was the corn a bushel?

9. $\frac{3}{8}$ of the number of hours in a day, is the number of hours I sleep. How many hours do I sleep?

10. $\frac{2}{3}$ of the number of hours I sleep, is the number of hours I study. How many hours do I study?

11. $\frac{1}{3}$ of the number of hours I study, is $\frac{1}{2}$ of the number of hours I play. How many hours do I play?

12. $\frac{2}{5}$ of the remainder of the day I spend at my meals, and the rest of the time in reading. How many hours do I spend each day at my meals? and how many in reading?

13. $\frac{8}{9}$ of 72 are how many times $\frac{1}{4}$ of 32?
14. $\frac{7}{9}$ of 63 are how many times $\frac{1}{7}$o f 49?
15. $\frac{2}{9}$ of 36 are how many times $\frac{1}{6}$ of 24?
16. $\frac{4}{9}$ of 54 are how many times $\frac{1}{4}$ of 12?
17. $\frac{5}{9}$ of 45 are how many times $\frac{1}{5}$ of 15?
18. $\frac{6}{9}$ of 27 are how many times $\frac{1}{6}$ of 12?
19. $\frac{8}{9}$ of 36 are how many times $\frac{1}{5}$ of 20?

SEVENTY-THIRD LESSON.

Dry Measure.

For measuring grain, fruits, roots, coal, salt, &c.

2 pints (pts.) make 1 quart, marked qt.
8 quarts " 1 peck, " pk.
4 pecks " 1 bushel, " bu.

Recite the above table. Read it backward thus:

1 qt. makes 2 pints.
1 pk. " 8 quarts.
1 bu. " 4 pecks.

Or thus:

In 1 bu. are 4 pecks.
" 1 pk. " 8 quarts.
" 1 qt. " 2 pints.

1. For what is this table used?

2. Which of these measures have you seen used, and for what?

3. How many pts. in 2 qts.? 8? 4? 5? 6? 7? 8? 9?

4. How many qts. in 18 pts.? 16? 12? 8? 14? 6?

5. How many qts., and pts. over, in 9 pts.?

6. How many in 3 pts.? 5? 7? 19? 11? 15? 17?

7. How many pks. in 16 qts.? 24? 32? 48? 72?

8. How many pks., and qts. over, in 10 qts.? 18? 27?

9. How many qts. in 2 pks.? 3? 5? 8? 7? 4? 10?

10. How many pks. in 4 bu.? 3? 2? 9? 7? 5? 6? 8?

11. How many bu., and pks. over, in 6 pks.?

12. How many in 5? 7? 10? 11? 19? 23? 13? 15?

13. How many qts. in a bushel?

14. How many qts. in a bu. and a pk., or 5 pks.?

15. How many pks. and how many qts. in a bu. and a half?

16. How many qts. in 1 bu. and 3 pks., or 7 pks.?

17. What letters stand for 1 pint? quart? peck? and bushel?

18. What letters stand for more than one of each? *Ans.* The same, with s added.

19. How many pts. in 1 pk., 1 qt. and 1 pt.?

20. What is $\frac{1}{4}$ of a bu. called? $\frac{1}{8}$ of a pk.? $\frac{1}{2}$ of a qt.?

21. Grain, salt, &c., are leveled with a ***strike.***

22. For fruits, roots, &c., the measure is ***heaped.***

SEVENTY-FOURTH LESSON.

Liquid Measure.

For measuring water, vinegar, oil, molasses and liquors.

2 pints (pts.)	make	1 quart,	marked	qt.
4 quarts	"	1 gallon,	"	gal.
31½ gallons	"	1 barrel,	"	bbl.
2 barrels	"	1 hogshead,	"	hhd.

1. Recite this table. Read it backward.
2. What denominations in this table, and how marked?
3. Which of these measures have you seen used, and for measuring what?
4. How many pts. in 2 qts.? 6? 8? 5? 3?
5. How many pts. in 1 gal.? 3? 4? 8?
6. What part or fraction of a gal. is 1 pt.? 3 pts.?
7. What part of a qt. is a pt.?
8. What part of a gal. is 1 qt.? 2? 3? 4?
9. How many qts. in 2½ gal.? 3¼? 4¾? 5½?
10. How many pts. in 1 gal., 1 qt. and 1 pt.?
11. If a gal. of vinegar costs 20 cents, how much will 3 qts. cost?
12. How much will a gal. cost at three cents a pint?
13. How much will 3 qts. of molasses cost at 36 cents a gal.?
14. Casks of 28 to 36 gals. are often called barrels.
15. Sugar and molasses casks holding from 3½ to4 bbls., are *called* hhds.
16. A fluid qt. contains 57¾ cubic inches.
17. A dry measure qt. contains about 67⅕ cubic ins., or about 1⅙ fluid quarts.
18. About how many qts. of water, oil, &c., will make a pk.? a bu.?
19. How many gals. in a hhd.?

NOTE.—In Compound numbers, there is commonly more copying of errors and untruths, than in any other part of Arithmetic. Many measures in our ordinary tables, are not in accordance with business customs; and they are also contrary to law. In this work, the tables are derived from ordinary business, or from the N. Y. State law of 1851, in which the standards are copied from those adopted by Congress in 1836.

SEVENTY-FIFTH LESSON.

Avoirdupois Weight.

For weighing groceries, farm produce, &c.

16	ounces (ozs.)	make	1	pound,	marked	lb.
25	pounds	"	1	quarter,	"	qr.
4	quarters	"	1	hund. weight,	"	cwt.
20	hund. weight	"	1	ton,	"	T.

1. Recite the above table. Read it backward.
2. Which of these denominations have you seen used?
3. With what are common articles weighed? *Ans.* With steelyards,—with balance, spring or platform scales, &c.
4. Tell the least, and the most, you ever saw weighed?
5. How many ozs. in ½ a lb.? ¼? ⅛? ¾? ⅜? ⅝? ⅞?
6. What cost 15 ozs. of cheese at 12 cents a lb.?
7. What cost 3½ lbs. of raisins at 18 cents a lb.?
8. What cost 4¼ tons of coal at $8 a ton?
9. What cost 6¾ tons of hay at $12 a ton?
10. How many cwt. in ¾ of a ton? ½? ⅕? ⅗?
11. How many lbs. in 2 qrs., or ½ a cwt.? 3 qrs.?
12. What is the weight of each scholar in this class?

Troy Weight.

For weighing gold, silver and jewelry.

24	grains (grs.)	make	1	pennyweight,	marked	pwt.
20	pennyweights	"	1	ounce,	"	oz.
12	ounces	"	1	pound,	"	lb.

1. Recite this table. Read it backward.
2. How many denominations, and how marked?
3. Jewelers use very accurate balance scales, with little brass weights.
4. Why is not gold weigned by the cwt. or T., and hay, coal, grain, &c., by the gr., pwt. or oz.?
5. Gold chains generally sell at about $1 a pwt. At that rate, how much would ¾ of an oz. cost? ½? ⅗?
6. A Troy lb. is nearly ⅕ less than an Av. lb.

SEVENTY-SIXTH LESSON.

Long Measure.

For measuring distance.

12	inches (in.)	make	1 foot,	marked	ft.
3	feet	"	1 yard,	"	yd.
5½	yards (16½ ft.)	"	1 rod,	"	rd.
40	rods	"	1 furlong,	"	fur.
8	furlongs	"	1 mile,	"	m.
3	miles	"	1 league,	"	lea.

1. Recite this table. Read it backward.

1. What denominations in this table, and how marked?

3. Which have you seen used, and for what?

4. Hold your hands an inch apart; a foot; a yard.

5. What fractions of an in. are used? Halves, quarters, tenths, &c.

6. What fractions of a yard are used? *Ans.* Halves, fourths or quarters, eighths and sixteenths.

7. How many ins. in 1 yd.? ½ yd.? ¼ yd.? ⅛ yd.?

8. How many ins. in 1½ ft.? 2½? 3¼? 4¼?

9. How many yds. in 12 ft.? 9? 15? 24? 18? 27?

10. How many rds. wide is the street or road?

11. Name something 1 mile off; 2 miles; 3 miles.

12. How many ms. in 9 leas.?

13. If an army march 20 leas. a day, how many miles do they travel daily?

14. If a fast horse can trot a m. in 3 minutes, in how many minutes, at that rate, can he trot 6 ms.? 8? 4?

15. How many ins. is ½ of a ft.? ¼? ⅓? ¾?

16. What is your height? Father's? Mother's?

17. 6 ft. make 1 fathom,—a measure of the depth of water.

18. How many ft. are 5 fathoms? 3? 4? 9? 7? 6?

19. How many fathoms are 48 ft.? 30? 12? 54?

20. 4 ins. make 1 hand,—a measure of the height of horses directly over the front feet.

21. What is the height in ins. and ft. of a horse 16 hands high? 14? 15?

SEVENTY-SEVENTH LESSON.

United States Money.

10 mills	make	1 cent,	marked	ct.
10 cents	"	1 dime,	"	d.
10 dimes	"	1 dollar,	"	doll. or $.
10 dollars	"	1 eagle.	"	E.

1. Recite this table. Read it backward.

2. What denominations in this table, and how marked?

3. Do you multiply or divide, in changing a denomination of less value, weight or measure to a greater?

4. Do you multiply or divide, in changing dimes to dollars?

5. Do you multiply or divide, in changing a denomination of greater value, weight or measure to a less?

6. Do you multiply or divide, in changing eagles to dollars?

7. The government of our country makes money of gold, silver and copper, and stamps its name, the four words "United States of America," on every piece.

8. The half-cent and cent are made of pure copper.

9. The mill is only $\frac{1}{10}$ of a cent, and is not coined.

10. The 3 cent piece, half-dime, dime, quarter-dollar, half-dollar and dollar, are made of silver, mixed with about $\frac{1}{10}$ copper, to harden them, and prevent their wearing out by constant use.

11. The gold dollar, quarter-eagle, [$2½,] $3 piece, half-eagle, [$5,] eagle, double-eagle, [$20,] are made of gold, mixed with about $\frac{1}{20}$ silver and $\frac{1}{20}$ copper, to harden them.

12. If your father had 1 of each of these gold coins, how many dolls. would he have?

13. How many dimes equal ½ a doll.? ¼ of a doll.?

14. How many cents equal ½ a doll.? ¼ of a doll.?

15. Some say this sign, [$,] was made first, by placing U on S for United States.

16. Bank-bills are promises to pay gold or silver.

17. Our 14 coins have name, date, 13 stars, &c., on them.

NOTE.— At the California Assay office, $¼, $½ and $50 pieces, are made of gold, but they are not regular U. S. coins.

SEVENTY-EIGHTH LESSON.

Time.

60	seconds (secs.)	make	1	minute,	marked	m.
60	minutes	"	1	hour,	"	h.
24	hours	"	1	day,	"	d.
7	days	"	1	week,	"	wk.
4	weeks	"	1	lunar mo.,	"	mo.
13	lunar mos.	"	1	year,	"	y.
12	calendar mos.	"	1	year,	"	y.
52	weeks	"	1	year,	"	y.

1. Recite this table. Read it backward.
2. What denominations in this table, and how marked?
3. Move your hand and count seconds.
4. Clocks beat or tick from 1 to 3 times, and watches, from 1 to 4 or more times, in a second.
5. A clock pendulum 3 ft. 3 ins. long, beats once in a second. The shorter it is, the faster it goes.

Names of the cal. mos.	Abbreviations.	No. of days.	No. of the mo.	What month of each season.		
January,	Jan.,	31,	1st,	2d	Winter	mo.
February,	Feb.,	28,*	2d,	3d	"	"
March,	Mar.,	31,	3d,	1st	Spring	"
April,	Apr.,	30,	4th,	2d	"	"
May,	——	31,	5th,	3d	"	"
June,	Jun.,	30,	6th,	1st	Summer	"
July,	Jul.,	31,	7th,	2d	"	"
August,	Aug.,	31,	8th,	3d	"	"
September,	Sept.,	30,	9th,	1st	Autumn	"
October	Oct.,	31,	10th,	2d	"	"
November,	Nov.,	30,	11th,	3d	"	"
December,	Dec.,	31,	12th,	1st	Winter	"

6. Recite each line with proper headings.
7. Recite and explain this verse.

30 days hath September,
April, June, and November;
All the rest have 31,
Except the 2d month alone;
Which has just 8 beside a score,† 120
And every *fourth year, one day more.

SEVENTY-NINTH LESSON.

Prime and Composite Numbers.

A Prime number is one that can NOT *be obtained by multiplying together two or more numbers except itself and* 1. 1, 2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 59, 61, 67, 71, 73, 79, 83, 89, 97, *are Prime numbers.*

A Composite number is one that CAN *be obtained by multiplying together two or more numbers except itself and* 1.

The Prime Factors of a composite number are such prime numbers, except 1, *as multiplied together, will produce the number.*

Prime Factors of the Composite numbers from 4 *to* 99.

4; 2,2. 6; 2,3. 8; 2,2,2. 9; 3,3. 10; 2,5. 12; 2,2,3. 14; 2,7. 15; 3,5. 16; 2,2,2,2. 18; 2,3,3. 20; 2,2,5. 21; 3,7. 22; 2,11. 24; 2,2,2,3. 25; 5,5. 26; 2,13. 27; 3,3,3. 28; 2,2,7. 30; 2,3,5. 32; 2,2,2,2,2. 33; 3,11. 34; 2,17. 35; 5,7. 36; 2,2,3,3. 38; 2,19. 39; 3,13. 40; 2,2,2,5. 42; 2,3,7. 44; 2,2,11. 45; 3,3,5. 46; 2,23. 48; 2,2,2,2,3. 49; 7,7. 50; 2,5,5. 51; 3,17. 52; 2,2,13. 54; 2,3,3,3. 55; 5,11. 56; 2,2,2,7. 57; 3,19. 58; 2,29. 60; 2,2,3,5. 62; 2,31. 63; 3,3,7. 64; 2,2,2,2,2,2. 65; 5,13. 66; 2,3,11. 68; 2,2,17. 69; 3,23. 70; 2,5,7. 72; 2,2,2,3,3. 74; 2,37. 75; 3,5,5. 76; 2,2,19. 77; 7,11. 78; 2,3,13. 80; 2,2,2,2,5. 81; 3,3,3,3. 82; 2,41. 84; 2,2,3,7. 85; 5,17. 86; 2,43. 87; 3,29. 88; 2,2,2,11. 90; 2,3,3,5. 91; 7,13. 92; 2,2,23. 93; 3,31. 94; 2,47. 95; 5,19. 96; 2,2,2,2,2,3. 98; 2,7,7. 99; 3,3,11.

Study each number from 1 to 99 inclusive, till you can tell, without the book, whether it is Prime or Composite; and, if Composite, how many and what are its Prime Factors.

Multiply together the Prime Factors of each number. 26 of these numbers are Prime; 73 are Composite. 34 of the Composite numbers have each 2 factors; 22 have 3; 11 have 4; 4 have 5; 2 have 6.

EIGHTIETH LESSON.

Roman Notation.

There is another mode of representing numbers, sometimes used on the faces of clocks and watches, on tombstones,— to number lessons, chapters and sections in books, &c.,— where it is supposed it will make a better appearance than the Arabic figures.

This notation employs the seven capital letters, I, V, X, L, C, D, M; and the manner of using the first four of them, you may now learn.

I represents 1, V 5, X 10, L 50.

When a letter is repeated, its value is repeated.

Thus, I, II, III, represent 1, 2, 3.
" X, XX, XXX, represent 10, 20, 30.

A letter of less value at the right, is ADDED.

Thus, VI, VII, VIII, represent 6, 7, 8.
" XI, XII, XIII, represent 11, 12, 13.
" LX, LXX, LXXX, represent 60, 70, 80.

A letter of less value at the left, is SUBTRACTED.

Thus, IV, IX, represent 4, 9; XL, 40.

V and L are never subtracted, nor repeated.

From these explanations, learn and tell what each of the following combinations represent, and why. Also tell in what respects the different columns and the same lines are alike and unlike.

I.	XI.	XXI.	XXXI.	XLI.	LI.	LXI.	LXXI.	LXXXI.
II.	XII.	XXII.	XXXII.	XLII.	LII.	LXII.	LXXII.	LXXXII.
III.	XIII.	XXIII.	XXXIII.	XLIII.	LIII.	LXIII.	LXXIII.	LXXXIII.
IV.	XIV.	XXIV.	XXXIV.	XLIV.	LIV.	LXIV.	LXXIV.	LXXXIV.
V.	XV.	XXV.	XXXV.	XLV.	LV.	LXV.	LXXV.	LXXXV.
VI.	XVI.	XXVI.	XXXVI.	XLVI.	LVI.	LXVI.	LXXVI.	LXXXVI.
VII.	XVII.	XXVII.	XXXVII.	XLVII.	LVII.	LXVII.	LXXVII.	LXXVII.
VIII.	XVIII.	XXVIII.	XXXVIII.	XLVIII.	LVIII.	LXVIII.	LXXVIII.	LXXXVIII.
IX.	XIX.	XXIX.	XXXIX.	XLIX.	LIX.	LXIX.	LXXIX.	LXXXIX.
X.	XX.	XXX.	XL.	L.	LX.	LXX.	LXXX.	

HARVARD COLLEGE
LIBRARY

THE ESSEX INSTITUTE
TEXT-BOOK COLLECTION

GIFT OF
GEORGE ARTHUR PLIMPTON
OF NEW YORK

JANUARY 25, 1924

Table of Sums and Differences

	10	11	12	13	14	15	16	17	18	19	20	21	22
9	19	20	21	22	23	24	25	26	27	28	29	30	31
10	20	21	22	23	24	25	26	27	28	29	30	31	32
11	21	22	23	24	25	26	27	28	29	30	31	32	33
12	22	23	24	25	26	27	28	29	30	31	32	33	34
13	23	24	25	26	27	28	29	30	31	32	33	34	35
14	24	25	26	27	28	29	30	31	32	33	34	35	36
15	25	26	27	28	29	30	31	32	33	34	35	36	37
16	26	27	28	29	30	31	32	33	34	35	36	37	38
17	27	28	29	30	31	32	33	34	35	36	37	38	39
18	28	29	30	31	32	33	34	35	36	37	38	39	40
19	29	30	31	32	33	34	35	36	37	38	39	40	41
20	30	31	32	33	34	35	36	37	38	39	40	41	42
21	31	32	33	34	35	36	37	38	39	40	41	42	43
22	32	33	34	35	36	37	38	39	40	41	42	43	44
23	33	34	35	36	37	38	39	40	41	42	43	44	45
24	34	35	36	37	38	39	40	41	42	43	44	45	46
25	35	36	37	38	39	40	41	42	43	44	45	46	47
26	36	37	38	39	40	41	42	43	44	45	46	47	48
27	37	38	39	40	41	42	43	44	45	46	47	48	49
28	38	39	40	41	42	43	44	45	46	47	48	49	50
29	39	40	41	42	43	44	45	46	47	48	49	50	51
30	40	41	42	43	44	45	46	47	48	49	50	51	52
31	41	42	43	44	45	46	47	48	49	50	51	52	53
32	42	43	44	45	46	47	48	49	50	51	52	53	54